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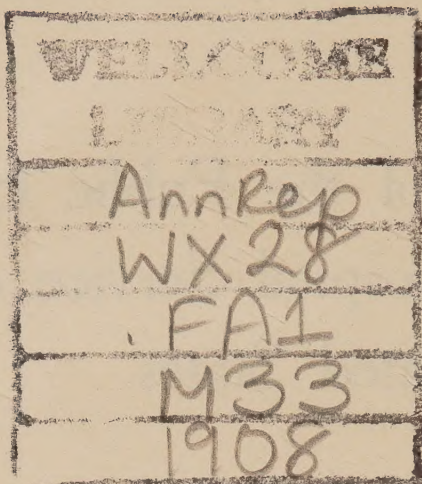
ANNUAL REPORT OF THE
Surgeon-General of the Public Health
and Marine-Hospital Service of
the United States

FOR THE FISCAL YEAR

1908



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TREASURY DEPARTMENT.

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Public Health and Marine-Hospital Service.

OPERATIONS
OF THE
UNITED STATES PUBLIC HEALTH AND
MARINE-HOSPITAL SERVICE

1908

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LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
Washington, January 23, 1909.

SIR: In accordance with section 9 of the act of Congress approved July 1, 1902, entitled "An act to increase the efficiency and change the name of the Marine-Hospital Service," I have the honor to transmit herewith the Annual Report of the Surgeon-General of the Public Health and Marine-Hospital Service for the fiscal year 1908.

Respectfully,

GEO. B. CORTELYOU,
Secretary.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

ANNUAL REPORT OF THE SURGEON-GENERAL OF THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

TREASURY DEPARTMENT,
BUREAU OF PUBLIC HEALTH AND
MARINE-HOSPITAL SERVICE,
Washington, D. C., November 30, 1908.

SIR: I have the honor to submit, for transmission to Congress, in accordance with the act of July 1, 1902, the following report of the transactions of the Public Health and Marine-Hospital Service of the United States for the fiscal year ended June 30, 1908, this being the thirty-seventh annual report of the service in the one hundred and tenth year of its existence, and the seventh annual report under its present name.

PLAGUE IN SAN FRANCISCO.

As narrated in the last annual report, a fatal case of plague in San Francisco was reported in May, 1907, a little more than three years after the last case reported in the previous outbreak in the same city. The case occurred May 24, in a sailor, and was diagnosed at the United States Marine Hospital, where the patient had been sent for treatment. This man had slept on board continuously for five or six weeks prior to falling ill, but at intervals had taken his meals at a lodging house near the water front in San Francisco (247 Steuart street). Immediately after sending the patient to the hospital, his vessel sailed for Oregon ports, struck four days later and sank at sea; her crew, returning to San Francisco on passing vessels, arrived in that city on June 7. They were given a thorough examination at quarantine, found free from glandular enlargement, without temperature, and all were released.

No other case occurred until August 12, when a sailor on the steamship *Samoa* fell ill with the disease. This man, with the exception of about forty-five minutes, had not left his vessel for any purpose whatever for more than six weeks. The vessel was given a thorough fumigation for the destruction of vermin at the United States quarantine station, San Francisco, her crew bathed, and held for seven days.

On August 14 a case occurred in San Francisco in the block bounded by Stockton, Du Pont, Francisco, and Bay streets, and this was quickly followed by others in other localities in the city.

Efforts were made by local and state authorities, assisted by officers of the service, to suppress the disease, but on September 4, 1907, a

telegram was addressed to the President by the mayor of San Francisco, requesting the Federal Government to take immediate charge of the work of suppression. Passed Asst. Surg. Rupert Blue was assigned to the charge of plague-suppressive measures in San Francisco and vicinity, and at once entered upon the discharge of his duties. On his arrival he found that the disease was widespread, cases having occurred in all portions of the city, and the difficulties of the situation were added to by the disorganized and ruinous condition of the city of San Francisco consequent upon the earthquake and conflagration of April, 1906.

The city was undergoing a period of reconstruction. The streets in the burned districts were littered with all manner of débris, and in certain sections of the city many persons were living under most insanitary conditions. Certain districts were very much congested, owing to the sudden influx of refugees following the conflagration of 1906, together with the lack of legal restrictions regarding the placing of frame cottages and the building of stables. Thousands of refugees had availed themselves of the vacant and sparsely settled portions of the city to establish temporary homes, some of which were scattered here and there, some clustered in small groups, while others congregated in large, irregular camps, covering an area of one or two blocks. Most of these abodes were without any of the ordinary sanitary conveniences, and in some of the irregular camps conditions were most deplorable. Uncovered holes in the earth, from which flies rose in clouds, served as latrines, wash water and slops ran under and between the shacks, garbage was promiscuously scattered, and rubbish of all sorts littered the premises. The shacks themselves were nondescript affairs, constructed of scraps of sheet iron and bits of old lumber, and could not have been kept in a sanitary condition had the occupants been willing.

Several large refugee camps were in operation under the direction of the Red Cross. These were without exception maintained in good sanitary condition. In some locations speculators had built irregular camps, and in these sewer connections and toilet accommodations were often most inadequate and the camps themselves filthy in the extreme.

Garbage was almost universally kept in open wooden boxes, barrels, old boilers, and in many cases was taken to the nearest vacant lot and dumped. The scavenger service of the city was performed by private individuals, who removed the garbage for a stated sum per week. One of the most objectionable features of this system was the fact that under it the scavenger was supposed to furnish garbage cans for the householder. These were, almost without exception, nondescript containers of most insanitary pattern and without covers.

The majority of the stables in the city were hastily constructed buildings without any sanitary arrangements whatever. Grain was kept on the floor in sacks or in open wooden bins, and no care was taken to prevent the entrance of rats, and very few stables were provided with suitable manure bins. There were numerous chicken yards throughout the city and the unconsumed food therein furnished a ready pabulum for rats.

In all probability the topography and character of the soil had little to do with the spread of plague in San Francisco, for the disease was found about equally in the hills and valleys and on soil varying from sand to bedrock. One fact, however, is very apparent, and that

is that the disease both among rodents and human beings occurred almost uniformly in buildings of wooden construction, often with hollow walls and therefore freely accessible to rats. This also probably explains the immunity of certain portions of the burned district wherein the wooden structures which were burned were replaced with reenforced concrete buildings which were absolutely impervious to rats.

From one end of the city to the other were thousands of rodent-harboring places. Stables with wooden floors close to the ground, planked yards, débris in the vacant lots, defective basements and cellars, all afforded a safe shelter for rats. The result of this plentiful supply and convenient breeding and nesting places was a large rat population. Coincident with this condition, there was an unusual prevalence of flies and fleas.

Owing to the fact that many of the sewers had been destroyed and others badly injured by the earthquake, there were entire blocks which were cut off from all sewer connection. The city board of health was greatly hampered by lack of funds, and no well-organized campaign on a large scale had been begun.

The city was divided into districts and an active campaign looking to the eradication of the disease and the destruction of rats was entered upon. There were assigned to this duty in San Francisco 10 commissioned officers, 13 acting assistant surgeons, 31 inspectors, 56 assistant inspectors, 102 foremen, and 534 laborers. In this campaign the measures instituted by the service received the hearty support and cooperation of the state and local authorities and others. The governor of the State, the state board of health, the mayor of San Francisco, the board of supervisors of the city and county of San Francisco, the city board of health, the police department, the citizens' health committee, the state medical association, and committees from various improvement clubs, labor organizations, trades councils, mercantile bodies, and women's clubs were active in co-operating with the federal officers in their suppressive measures.

A large fund (\$150,000) was raised for plague-suppressive and sanitary measures by the citizens' health committee. The board of supervisors appropriated \$30,000 monthly for the months of September, October, and November, 1907, and after that time allotted \$11,000 a month for the same purpose. The expenses of the Government were limited up to the end of the fiscal year to the pay of officers and employees and the expenses of laboratory investigations, the cost of the strictly sanitary work being borne by the city of San Francisco.

Doctor Blue detailed officers for the purpose of addressing public meetings which the citizens' health committee called, and in a short time there were comparatively few people in the city and county of San Francisco who were not thoroughly instructed as to the history, nature, and mode of spread of the disease and the necessity for placing the entire city in a sanitary condition. This citizens' health committee issued thousands of pieces of literature calling upon the general public to take an active part in cleaning the city.

Up to June 30, 1908, there were 159 cases of plague, of which 121 were verified bacteriologically and 38 clinically. There were 77 deaths from the disease. One thousand six hundred and eighty sick persons suspected of the infection of plague were inspected, 3,973

inspections of the dead were made, 5,320 houses were disinfected, and numerous sanitary nuisances were abated. A total of 203,642 rats were trapped, and of these 90,720 were examined. Sixty thousand three hundred were examined in the service laboratory, and of these rats 306 were found infected with plague. A total of over 7,000,000 poisons for the destruction of rats were placed.

The last case of human plague in San Francisco was reported in February, 1908, but the campaign against plague-infected rats and the sanitary measures for the improvement of conditions in San Francisco are being continued with unabated vigor.

The following table shows the number of plague rats and the number of cases and deaths from human plague occurring in San Francisco during 1907 and to November 30, 1908:

STATEMENT OF PLAGUE IN SAN FRANCISCO FROM DATE OF OUTBREAK, MAY, 1907, TO NOVEMBER 30, 1908.

	Plague rats.	Human plague.	
		Cases.	Deaths.
1907.			
May	0	1	1
June.....	0	0	0
July.....	0	0	0
August.....	0	11	6
September.....	0	41	21
October.....	0	33	24
November.....	31	36	17
December.....	43	36	8
1908.			
January.....	64	1	1
February.....	111	1	0
March.....	58	0	0
April.....	24	0	0
May.....	32	0	0
June.....	3	0	0
July.....	2	0	0
August.....	1	0	0
September.....	0	0	0
October.....	2	0	0
November.....	0	0	0
Total (1907-8).....	371	160	78

ORGANIZATION AND ADMINISTRATION.

The following details concerning organization and administration in connection with the plague campaign in San Francisco are extracted from the report of Passed Assistant Surgeon Blue.

Headquarters were established at 401 Fillmore street. The work there was divided into three divisions, viz., statistics, personnel and accounts, and laboratory investigations. The divisions of statistics and personnel and accounts were in charge of the executive officer, Passed Asst. Surg. W. C. Rucker, who was responsible for the organization and discipline in the districts. Complete files and card index systems of all the data relating to the work were maintained at the general headquarters.

The division of laboratory investigations was in charge of Passed Asst. Surg. H. A. Stansfield until March 23, 1908, after which the work was in charge of Passed Asst. Surg. Carrol Fox, with whom was associated Passed Asst. Surg. G. W. McCoy, as bacteriologist.

The work of the laboratory was divided into four parts and included examination of rats, the attendance at or performance of necropsies, the examination of suspicious cases of illness, and general laboratory work.

The work was carried out along the lines laid down by the Indian plague commission, depending on gross lesions for a diagnosis rather than on the microscopical findings alone. Careful search was made for lesions of the cervical, axillary, inguinal, pelvic, and mesenteric glands. The condition of the liver, spleen, and the presence or absence of pleural effusion was noted. The diagnosis was confirmed bacteriologically by the triple test in all cases that were diagnosed as plague.

The laboratory also undertook the examination of the various biological products which are sold as rat exterminators. This line of work is still being pursued, but the present outlook is not at all encouraging.

The laboratory force examined during the year 300 cases of illness for the purpose of determining the cause. This is in addition to the diagnoses which have been made by the medical officers in charge of districts. The laboratory has also done considerable work relative to the identification of fleas taken from rodents and human beings. The result of these identifications are taken up under the head of fleas.

At the time when the service took charge of the plague-suppressive measures in San Francisco, the city had already been divided into districts by the local health officer and a small force of men under the direction of local physicians was at work in each of these subdivisions. For the most part the boundaries of these districts were not changed, and most of the local physicians in charge of districts were retained as acting assistant surgeons. At that time the city and county of San Francisco paid for labor and supplies, while the service furnished officers to direct the work. This system continued in force until November 25, 1907, when the service, in response to a request from the finance committee of the board of supervisors of the city and county of San Francisco, assumed the payment of the salaries of the men employed.

Each district was placed in charge of a medical officer or acting assistant surgeon. An office was furnished him in a central portion of his district, telephone connection installed, and a sufficient amount of supplies for the beginning of the work issued to him. The district quota was determined by the character, population, and sanitary condition of the district. The force consisted of inspectors and assistant inspectors, whose business it was to conduct the sanitary reconnoissance of the district, including house-to-house and garbage-can inspection. Also the following up of complaints of nuisances, the direction of the foremen, procuring and serving of warrants, and the compiling of the various data. The laborers were divided into gangs of five each and were under the direction of foremen, who were held responsible for the time, good conduct, and efficiency of their men. The laborers were employed in rat trapping, poisoning, fumigating, and disinfection.

The unit of organization was five laborers, over whom was placed a foreman. This constituted a squad. For every two squads there was one assistant inspector, and for every two assistant inspectors one inspector.

DUTIES OF INSPECTORS.

For the purpose of survey and inspection each of the districts was divided into subdistricts by the medical officers in charge, and an inspector or assistant inspector placed in charge of each subdivision. Unless absolutely necessary, inspectors were not changed from one subdistrict to another, as it was found that time was required for the inspector to become familiar with his territory and because householders objected to duplicate inspection by different men. In addition to making a sanitary survey, inspectors were charged with the enforcement of the following ordinances:

Ordinance No. 384.—Requiring the concreting of all floors and rat proofing of all coops and houses in which chickens, rabbits, geese, ducks, pigeons, etc., are kept within certain limits of the city and county of San Francisco.

Ordinance No. 369.—Requiring the rat proofing of all buildings and basements, the maintenance of rat traps in slaughterhouses, docks, warehouses, etc., preventing dumping of garbage, offal, manure, etc., on any land or water within the limits of the city and county of San Francisco, and requiring the keeping of all buildings in a sanitary condition.

Ordinance No. 357.—Requiring every residence or other building where food is kept for human consumption to be provided with garbage can and scavenger service.

Ordinance No. 13.—Requiring the screening of all bakeries, restaurants, and other places where human food is kept.

Ordinance No. 1409.—Requiring that not more than two cows be kept within certain limits of the city and county of San Francisco.

Ordinance No. 1410.—Requiring that swine be kept only for the purpose of loading and unloading and slaughtering, and only within the limits of Butchertown reservation.

Ordinances Nos. 65-1029.—Requiring vehicles used for transportation of garbage, swill, and manure, to be approved by the board of health.

Ordinance No. 138.—Prohibiting human occupation of insanitary structures or cellars.

Ordinance No. 162.—Prohibiting the selling of herbs or vegetables grown within 1,000 feet of a sewer outlet.

Ordinance No. 193.—Requiring all unsafe and insanitary stables condemned by the board of health and ordered vacated.

Ordinance No. 328.—Requiring all unsafe and insanitary structures unfit for human habitation condemned by the board of health and vacated.

SANITARY SURVEY.

The sanitary survey was made for the purpose of obtaining information regarding the sanitary condition of the entire city and county of San Francisco. Each inspector was provided with a number of printed forms bound into a pad, and he was required to visit all premises in his subdistrict for the purpose of obtaining the information necessary to fill out these blanks. These were turned in to the district headquarters and were there entered on cards, which were placed in the card index. The back of the card was also used for noting further nuisances and abatements. A card was made out for each of the premises and filed by blocks. When a reinspection was made cards were taken out by the inspector, verified, and brought up to date. The inspectors were in the field about seven hours per day, the remaining hour being devoted to sending notices to owners or agents not on the premises, making reports, etc. In the residence district it was not found practicable to make inspections before 9 a. m. It was found that the average amount of time required to make a careful inspection was twenty minutes. Inspection of stables, res-

taurants, bakeries, groceries, and markets was made by inspectors specially detailed for that purpose.

Whenever a nuisance was found, the person responsible for the same was given notice on a form provided by the city board of health, showing exactly what was necessary to correct the nuisance and giving a certain length of time in which to do this. At the expiration of the given time another inspection was made, and if the nuisance was still unabated, a second notice was served or the responsible person cited to appear at the district headquarters to show cause why he should not be prosecuted. It was very seldom found necessary to carry cases into the courts. Out of 82,554 abatements of nuisances obtained, only 370 arrests were made, and of these arrests, \$587 in fines were imposed.

In connection with the sanitary survey a method was devised whereby certain valuable data gathered by the inspectors might be made a matter of ready reference as well as permanent record. This consisted in rating each piece of property after the method employed by fire insurance companies in indicating fire risks, the rating depending entirely upon the condition of the building or structure with reference to its affording rat entrance or harboring places. Thus, buildings in poor sanitary condition, readily admitting the entrance and propagation of rats, were rated as zero. Those which were impervious to the entrance or harboring of rats were rated 100.

This plan has been employed in one of the districts only, but gives promise of being a very valuable method, which might well be adopted in making a sanitary survey of any city, no matter whether it be infected or not.

One of the results of this work was the installation of garbage cans in practically every home in San Francisco. Reference to a table submitted will show that 49,046 new garbage cans were installed and are now in use in the city of San Francisco.

It is interesting to note, in this connection, a large increase in the amount of garbage destroyed by the garbage incinerator since the beginning of the campaign. This increase shows that the people of San Francisco are thoroughly educated to the necessity for the careful disposal of their garbage and refuse.

STABLES.

Stables, furnishing as they do both food and habitation for the rat, were found to be overrun with rodents. Therefore, with the assistance of the city board of health, there was secured from the supervisors the passage of ordinances requiring that all stables should be concreted throughout with a concrete side wall 18 inches high, all openings near the soil level to be screened, sewer connections made, and metal-lined feed and manure bins installed. This was one of the most important measures of the campaign. Those stables which by reason of their construction were of insufficient value to warrant the expenditure of money which would thus be entailed were condemned by the board of health, in most cases being vacated, and sometimes being destroyed. As a result of this work 2,713 stables complied with the ordinance in its entirety and 847,926 square feet

of concrete was laid; 916 were vacated, 371 destroyed, and 1,574 are pending. At the present time (June 30, 1908) there remain in the city of San Francisco 2,713 which are complying with the ordinance and only 1,574 which have not complied.

Reference to a table submitted shows that the percentage of result obtained with regard to stables was 70.25 per cent. It should be noted, however, that this does not represent the ultimate result, as many of the stables which are classed under the head of "pending" are in process of compliance with the ordinances, and that 95 per cent of the stables of the city will be in permanent sanitary condition by August 15, 1908.

In order that no hardship might be worked, a set of stable regulations were formulated by a joint committee consisting of representatives from the service, the city board of health, the citizens' health committee, the district attorney's office, and the Stablemen's Association. These regulations took cognizance of the fact that certain stables which were located on a side hill, for example, could not be rat proofed by ordinary methods, and that in other cases stables that were under a term lease could not be rat proofed without making the cost of occupation of the stable prohibitive.

SEWER REPORT.

In view of the important relationship existing between the condition of the sewers and rodent life, district officers were directed on March 27, 1908, to make a careful sanitary survey of the sewers in their districts. Their reports were received on April 24, 1908, and were thoroughly illustrated by maps showing the size and direction of the flow of sewers, their condition as far as possible, the number of leads drained by each main, the position of the manholes and catch basins, and the number of houses and blocks without sewer connection.

This is said to have been the first complete inspection of the sewers made in twenty years. It disclosed the fact that the sewers of San Francisco were in a deplorable condition. In certain localities, especially in filled ground, the line and grade of the sewers were dislodged by the earthquake and the main pipes broken in places, allowing sewage to seep into the surrounding soil. In many places the individual leads from occupied premises seemed to have had insufficient gradient or to have been too small for the area they were supposed to drain. The corner catch basins were generally obstructed with sand and street sweepings, and recent rat runs and signs were in general evidence in the main and lateral sewers. In a few instances the sewers were simply boxes constructed of redwood, and in others practically open creeks. It is but fair to state, however, that this was not the fault of the present board of public works, whose members have done all in their power to remedy this condition with the inadequate funds at their disposal. This report was submitted to the citizens' health committee, who incorporated it in a pamphlet and used it as an argument for the expenditure of money for the placing of the sewers of the city in a sanitary condition.

The supervisors of the city of San Francisco have made an allotment in their new bond issue for the complete rearrangement and reconstruction of the entire sewer system and the installation of sewers

in districts at present unsupplied. The new mains will be constructed of reenforced concrete and the system made modern throughout. Inasmuch as the sewers appear to be the great highway for rodent life, this is an important measure in the permanent eradication of plague from that city.

INSPECTION OF OUTGOING MERCHANDISE.

The chief quarantine officer of the Canal Zone issued an order that food products originating in San Francisco would not be admitted unless accompanied by a certificate showing that they had not been stored in any warehouse in a district where plague-infected rats had been captured. Inasmuch as all of the warehouse districts had furnished infected rats, it was decided that a certificate showing that the goods had been stored in a rat-proof warehouse and were free from rat infestation would answer the same purpose and at the same time very greatly facilitate commerce. At the beginning of the campaign there were few rat-proof warehouses in the city of San Francisco, and such certificates could be seldom issued unless the goods in question were simply transshipments which were loaded direct from river boats to the steamers bound for Panama or else had been carried across the city in sealed cars. Recently, however, many of the warehouses have been rat proofed, and in this way shipments have been greatly facilitated.

The goods were first inspected to see that they were stored in a rat-proof warehouse and were free from rat infestation. A permit was then issued, and after the issuance of the bill of lading by the steamship company the goods were reinspected by the same inspector to see that the articles shipped were identical with those for which the permit had been issued.

It was suggested to the Pacific Mail Steamship Company that they, with the assistance of the various shippers from the port of San Francisco, should construct a rat-proof compound on the wharf for the storage of goods from San Francisco. This has been done.

MANURE INSPECTION.

In order to bring about an earlier compliance with the stable regulations, the state board of health, acting upon the advice of Doctor Blue, to whom complaint had been made by the health officer of San Mateo County to the effect that dead rats were being shipped into that county in manure from the city of San Francisco, passed a resolution requiring a permit from the service prior to the shipment of manure from the city and county of San Francisco, either by common carrier or by wagons. The result of this resolution was the appointment of Dr. Raymond Russ as a state health inspector for the sole purpose of carrying out this order. At first it was necessary to refuse certificates to a large number of persons, but as soon as the owners of stables found that the manure, which had been a source of profit, would become a great expense on account of the cost of incineration at the city crematory unless they placed their stables in a sanitary condition in compliance with the city ordinance, they immediately set about making the necessary alterations. The result has been the concreting and rat proofing of a large number of stables.

RAG INSPECTION.

On account of the supposition that certain epidemics of plague have been spread by means of unsterilized rags, the rag traffic in California was investigated, and, on request, the board of health passed regulations governing the shipment of unsterilized rags.

INSPECTION OF THE DEAD.

In order that all cases of bubonic plague occurring in the city might be discovered so that antiplague measures might be instituted wherever human cases had occurred, the city board of health appointed three inspectors of the dead and passed a resolution forbidding the removal of bodies by undertakers until the corpses had been viewed by the inspector of the dead and a removal permit issued. It was found, however, that the inspectors could not cover the entire city, and therefore this work from 8 a. m. to 5 p. m. was done by the medical officers in charge of the districts. A permit was not issued in suspicious cases until after a necropsy had been held. The bodies of persons suspected of dying of bubonic plague were removed to the morgue of the city and county hospital and there examined. A representative of the service attended all the post-mortem examinations and the diagnosis of each case was decided by a board consisting of the service bacteriologist, the state bacteriologist, and the city bacteriologist. The tissues taken were examined bacteriologically for *B. pestis*. In order that there might be no error in diagnosis, the triple test was made in every human case from which specimens of tissue, blood, or sputum could be obtained. In clinical cases where such specimens were not obtainable for microscopic examination the diagnosis was passed upon by experts of the federal, state, and city health departments, who examined cases in consultation. In view of the controversy during the former outbreak, it was deemed advisable to have this agreement in every case. By request, the state and city boards of health appointed special bacteriologists to investigate independently and jointly all cases of plague discovered in San Francisco or Oakland.

DUTIES OF FOREMEN AND LABORERS.

Foremen were without exception working foremen, and in addition they were responsible for the five laborers under their direction. They inspected the work of the laborers as to the trapping of rats by visiting all the traps of one laborer one day and all the traps of another laborer on another day, repeating when the last was finished. Foremen of poisoners were responsible for the proper and careful placing of rat's bane and for the diligence and discipline of their men. They were also detailed with their gangs for the cleaning and burning of rubbish and disinfecting of premises.

Laborers reported for duty at 8 a. m. and after roll call were sent out on their various duties. Those engaged in trapping visited their traps, bringing in the captured rats, resetting, smoking, and otherwise preparing the traps. Others who were detailed as poisoners placed the poisoned croutons in rat holes and rat runs. Others worked in what is known as "wrecking crews," and armed with pick

and shovel would dig up rat runs and destroy rat nests and places of rat refuge, oftentimes closing up rat holes with cement or tin. Others were employed in cleaning and burning rubbish and garbage from vacant lots and otherwise destroying rat harboring places. Disinfectors did fumigating with sulphur or by sprinkling chlorinated lime or other disinfectant.

SCHOOL OF INSTRUCTION.

It was found that it was necessary to give special instruction if the best work was to be secured from the men. During the months of January, February, and March, 1908, a school of instruction was held weekly at the headquarters of medical officers in charge of each district. At each session lectures were given on such subjects as fumigation, disinfection, poisoning, rat proofing, city ordinances, bubonic plague as occurring in human beings and rodents, and such other subjects as seemed pertinent. Separate lectures were given to inspectors and assistant inspectors and laborers and foremen. Great benefit was derived from these meetings and they were found to be very useful in increasing the *esprit de corps*. As an incentive to better work promotions were made entirely on the basis of efficiency and inspectors, assistant inspectors, and foremen were given a warrant of their position signed by the commanding officer. Those men who served three months or over and left the service honorably were given an honorable discharge, showing the character of the work performed and the way in which it was done. This not only inspired the men to better work but furnished a good recommendation should the holder of the discharge wish to engage in sanitary work elsewhere. In the event of an epidemic in this or any other city in the United States such a document would be very valuable in securing men for the work.

TRAPPING RATS.

The trapping of rats constituted a very important measure of the campaign and was pursued uninterruptedly from the time of organizing the force. Gangs of five men, under the superintendency of a foreman, were provided with traps, and each foreman was assigned a number of blocks in which to carry on operations. Every incentive was offered to the laborers to acquire proficiency in this branch of the work. A short treatise was prepared outlining the best methods for catching rats, and these pamphlets were distributed not only to the employees, but also to the general public. This was also printed by the bureau in two different editions of the Public Health Report. In addition to a daily wage of \$2.50, a bounty of 10 cents per rat was paid to the rat catchers. The foremen instructed their men how and where to set their traps and kept a record of the results obtained by each laborer, which he reported daily to an inspector. Promotions and demotions were made in this branch of the work solely upon the ability of the men to catch rodents. The men became very expert at trapping, and there is scarcely a block in the city which has not furnished its quota of rats. The large wire-cage traps and spring traps were used, the former being found more effective in stables and warehouses where rats were plentiful, while the latter was used chiefly in

and around dwellings. Each laborer had about 25 cage and 30 spring traps. All sorts of articles were used for bait—cheese, bacon, fresh meat, liver, chicken heads, red pepper, fruit, wheat, nuts, etc. Rat catchers were chosen with great care, only reliable and careful men being detailed for the purpose. Rats were brought in to district headquarters at 11.30 a. m. and 5 p. m. Dead rats were carried in metal receptacles having a tight cover. Live rats were brought in in the cage in which they were captured, which was covered during transportation with a sack soaked in coal oil. As soon as the rats were caught they were tagged to show where, when, and by whom captured. If sick or found dead, this was noted on the tag. In order that a rat might not be repurchased, the left hind leg was cut off at the time of paying the bounty. One of the most vexatious problems of the campaign was the finding of a suitable rat tag. Linen, paper, cardboard, and various other materials were tried, and it was only after considerable experimentation that a tag filling all the requirements was secured. The one now in use is made of tough, heavy fiber. It has a small metal grommet and is attached to the rat by means of a piece of fine wire. The tag is marked with either waterproof draftsman's ink or an indelible pencil. The rats captured are carefully soaked in a solution of bichloride of mercury, 1 to 500, in order that the fleas upon their bodies may be killed. This was found necessary for the protection of those working in the laboratory. After this procedure the rats were placed in large metal cans having a bail and a tight-fitting lid, and were then transported to the laboratory at general headquarters for examination. The total rat catch was 203,642.

RAT STARVATION.

It was found that rats would not enter the traps or eat the poisoned food as long as other pabulum existed in abundance. The general public was therefore urged to clean all garbage from vacant lots, cellars, houses, etc., and have the same removed for incineration. Wherever this was done, and in order that the time might be saved this labor was performed by employees of the service, and in this way an enormous amount of garbage was collected and burned. This was not found necessary except in the beginning of the campaign. After the passage of the garbage-can ordinance the evil of throwing such refuse on vacant lots was practically abated.

SEWER WORK.

It was recognized that openings into the large brick and mortar sewers afforded the rat easy access to man. In fact the sewer mains of San Francisco are the great rodent highways. A number of men were placed at work in the sewers for the purpose of rendering the same rat proof by the use of bricks, mortar, and cement. This work has been completed in two districts and the results have been very gratifying.

POISONING.

Biological poisons.—The ideal method of rat destruction is the production of an epizootic amongst rats, harmless to human beings and domestic animals. It was hoped that Danysz's virus would fulfill

these conditions as it had on former occasions, but laboratory and field tests with all the available supplies, commercial and otherwise, of Danysz's virus failed to give satisfactory results. Several hundred square blocks were carefully covered with corn meal soaked in bouillon cultures with no appreciable decrease in the number of rats.

Mineral poisons.—Arsenic and phosphorus pastes of various strengths and different bases was used with considerable success. The paste was spread on bread and cut into small croutons and distributed by laborers specially trained for the work and chosen for their intelligence and obedience. An enormous number of rats were killed in this way. It is, of course, impossible to state the number, but inasmuch as men working in the sewers reported an unusual number of dead rats and large numbers were seen floating on the bay after a shower sufficiently heavy to thoroughly flush the sewers, it is believed that at least 700,000 were killed in this way.

RODENT CASES.

As soon as a case of rodent plague was discovered, the district from which the rat was taken was immediately telephoned, and in order that there might be no error in the matter, a letter was written to the medical officer in charge of the district informing him of the exact location from which the rat was taken, and directing him to redouble his antiplague measures in that vicinity, and render to headquarters a written report of the work he had done there. The antiplague measures employed were, as far as possible, exactly similar to those following the discovery of a case of human plague. Every known means was employed to encompass the destruction of rats and fleas. In no instance did human plague occur on premises which had been thoroughly disinfected following the removal of plague-infected rats.

OBSERVATION OF RODENT CONTACT.

It was considered quite as important to keep contacts to rodent cases under observation as those exposed to human cases; accordingly, a list of persons working or living in premises from which infected rats were taken was made and such persons kept under observation for eight days.

PLAGUE HOSPITAL.

When the service took charge in San Francisco it was reported to the bureau that the plague patients were being cared for in the contagious pavilion of the City and County Hospital. This structure was a large wooden building of a defective construction and swarming with rats. Several cases of plague had occurred there, and there was great danger of the spread of pest from the treatment of plague patients therein. Upon suggestion, therefore, the city board of health, with the assistance of Mr. Henry Payot, chairman of the hospital and health committee of the board of supervisors, constructed a plague compound inclosing about 2 acres at Army and De Haro streets. This was surrounded by a galvanized-iron fence 8 feet high, resting on a concrete base sunk 3 feet in the ground. On the inner side was placed an inverted trough to render impossible the escape of a rat should one, by any chance, be brought within the

inclosure. The patients were treated in cottages and provided with all necessary comforts. The treatment of the patients was in charge of Dr. A. A. O'Neill, assisted by a corps of nurses. The City and County Hospital was subsequently torn down and the general patients transferred to a temporary camp pending the erection of a new and modern hospital.

HUMAN CASES.

The routine followed in a human case was as follows: As soon as a sick person whose illness in any way resembled bubonic plague was discovered the case was reported to the board of health by the attending physician and then reported to the officer in charge of the district in which the case occurred. He then inspected the case and if, in his opinion, it was suspicious for plague the sick person was sent to the isolation camp. In case doubt existed in the officer's mind, an expert was sent from headquarters to pass upon the case. After the patient was admitted to the hospital the diagnosis was confirmed by bacteriological and clinical examination in all cases by representatives of the service and both the state and city boards of health.

The cases, for the most part, were of the bubonic type. In fact, there were glandular enlargements in 157 cases, or 98.74 per cent of the 159 cases. In 40 cases (25.15 per cent) there was general glandular enlargement. The group of glands most often involved was the right femoral, it being found enlarged in 35 cases, with the right inguinal in 4 cases, and the left cervical in 1 case. In the appended table a summary is given.

Gland classification.

General	40
Right femoral	35
Right femoral and inguinal	4
Right inguinal	7
Right cervical	10
Right axillary	7
Left femoral	19
Left femoral and inguinal	4
Left inguinal	5
Left cervical	1
Left cervical and right axillary	1
Left cervical and right femoral	1
Left axillary	10
Left axillary and inguinal	1
Left submaxillary and both axillæ	1
Both inguinals	1
Both femorals	4
Both groins	1
Both cervicals	1
Submaxillary	1
Submaxillary, both sides	1
Cervical and inguinal	1
Double inguinal and femoral	1
Not classified	2
Total	159

In all, 159 cases occurred, with 77 deaths. Of the 159 cases, 121 were verified bacteriologically and 38 clinically. Ninety-seven cases were of the purely bubonic type; 58 cases were of the bubo-septicæmic type; 2 cases were undetermined; 1 case was of the pneumonic type; and 1 case was of the bubo-pneumono-septicæmic type.

PROCEDURE UPON DISCOVERING A CASE SUSPICIOUS OF PLAGUE.

If the medical examination showed the case to be clinically plague, or if it was believed that a more thorough examination might reveal the presence of pest, the patient was removed to the plague hospital.

A rapid sanitary survey was then made of the premises from which the case was taken. In the block in which the case was located and the block immediately adjacent thereto particular cognizance was taken of the following facts:

First. Possible harboring places for rats in hollow walls and partitions of buildings, under the eaves, wooden flooring, and planking, piles of lumber or debris, and in the manure collected in and around stables.

Second. The presence of unscreened or unprotected rodent food, such as garbage, green groceries, etc.

Third. Human habitations violating sanitary and civic regulations.

Fourth. Stables, feed stores, and purveyors of food for human consumption not complying with ordinances requiring that all premises be kept free from rats.

The infected house was carefully rendered gastight with strips of paper and fumigated with sulphur in the proportion of 4 pounds per 1,000 cubic feet of initial air space. All bedding and wearing apparel used by the patient which could not be thoroughly disinfected was destroyed by fire. The house remained closed for six hours after the ignition of the last pot, at the end of which time the apartments were opened and aired, the curtains, carpets, and furniture thoroughly beaten in the sun and sprayed with a strong solution of carbolic acid, the floors were swept and the dust burned and afterwards they were scrubbed with a reliable disinfectant. A thorough search of the premises was then instituted for rat holes and rat-harboring places. Decayed wooden flooring forming walks, defective board flooring, and hollow wooden partitions were removed or opened. It may be remarked in passing that dead rats were frequently found in these places, often in large numbers. Rat holes in the floors and side walls were obliterated by filling them with broken glass and subsequently covering them with tin or metal sheeting. In many cases they were closed with cement. Rat's bane was spread in the infected and four contiguous blocks and all neighboring householders notified to maintain their premises in a clean condition.

FLEAS.

On account of the desirability of carrying on the investigation of the siphonoptera living upon rats, Doctor Blue, in compliance with an order from the bureau dated December 20, 1907, directed that a portion of the rats brought in alive should be chloroformed to kill them and any parasitic insects which might be upon them. As soon after death as possible the rats were carefully combed. The fleas recovered from them were placed in a small vial of alcohol (one vial for each host). Several thousand specimens were forwarded to the Hygienic Laboratory, where they are now being identified. The others were identified by Passed Asst. Surg. Carroll Fox. Assistance was given in this regard by R. W. Doane, of Leland Stanford Junior University, and Mr. M. B. Mitzmain, of the University of California.

After being filled, the vial was carefully labeled so as to show when and where the specimens were taken and the species and sex of the rodent host. These investigations show that a great preponderance of rat fleas recovered in San Francisco are of the species *Ceratophyllus fasciatus*. The percentages of 10,972 examined from all districts are as follows:

	Per cent.
<i>Ceratophyllus fasciatus</i> -----	68.07
<i>Pulex cheopis</i> -----	21.36
<i>Pulex irritans</i> -----	5.57
<i>Ctenopsyllus musculi</i> -----	4.48
<i>Ctenocephalus canis</i> -----	.52

This investigation was also important as showing the seasonal prevalence of fleas, not only as regards the average number per rat at certain seasons of the year but also as demonstrating the variation in various districts. The percentage of varieties according to districts was also made the subject of an interesting study. While all portions of the city showed the *Ceratophyllus fasciatus* in overwhelming majority, it was noted that certain districts showed a large percentage of *Pulex cheopis*, and others of the *Pulex irritans*.

The result of flea investigation proves to be extremely interesting and seems to throw considerable light on the question of transmission of plague from rat to man through the medium of the flea. Rats trapped in filthy basements and stables had the greatest number of fleas. Sickly and very young rats were flea-infested in an extreme degree. During the months of September and October fleas were unusually prevalent, and from 5 to 25 were found upon the body of a single rat, the number depending upon the sanitary condition of the premises from which it was taken. With the coming of rainy and cold weather, November, December, and January, a very great diminution of fleas was observed. This continued until early April, when there was a slight increase. During May and June of the present year the great scarcity of fleas generally, not only upon rats but on the streets and in public places, was a matter of common public comment. It should be noted that in the great bulk of human cases dead and plague-infected rats were generally found in the immediate neighborhood. It was thought that two of the Chinese cases received their infection from handling rats which had the plague, and frequently the homes of plague patients were found to contain dead rats in large numbers in the hollow walls, ceilings, or beneath the floors. Sewer rats seemed to have fewer fleas than rats living in stables and houses. Fleas were frequently found on rats which had been dead for some hours.

RAT GUARDS.

A matter of great importance—that is, the destruction of rats on board ships and the necessity of preventing their leaving infected cities by means of ships—was investigated. A careful inspection of the measures taken to prevent the embarkation and disembarkation of rats showed that in 95 per cent of the cases the rat guards employed were inefficient. Experiments made by Doctor Blue indicate that a new form of rat guard, consisting of two cone-shaped disks, placed base to base, having in their interior a trap which the rat may enter through four small openings, possessed many advan-

tages over the old form of guard. It is claimed for it that it is always perpendicular to the hawser; that it not only prevents rats from entering or leaving the ship but also traps them so that they may be killed by dipping the guard in water and drowning them.

In closing his report upon the measures in San Francisco, Passed Assistant Surgeon Blue acknowledges the aid given by the governor of the State in authorizing expenditures of some \$2,000 a month to prevent the spread of the disease in bay counties and in making several public speeches urging the general public to lend their assistance. The state board of health assisted by the framing and passage of certain state regulations and in arousing the bay counties to participation in the rat crusade; also in urging the organization of the California Central Sanitary Association.

The mayor of San Francisco lent the full weight of his official position to the service in the campaign by not only approving legislation looking to sanitary reforms, but also by making numerous public addresses which exerted great influence in arousing public enthusiasm. The board of supervisors of the city and county of San Francisco has already been mentioned. They aided by the enactment of suitable ordinances, in addition to the appropriations previously mentioned.

The city board of health, particularly through its president, was active in the making of stable ordinances and in condemning insanitary buildings in the face of much opposition. They placed a bounty on rats, which was a most important factor in increasing the rat catch.

The council of the state medical association, through its president, was active in calling the attention of the people to the dangers to be apprehended from a spread of the disease, and finally, Doctor Blue reports that the general attitude of the press, without exception, toward the plague-suppressive measures has greatly changed in recent years, and that the majority of the people now admit the dangers of plague and are willing to give their hearty cooperation to any measures looking to its suppression and eradication.

FUMIGATION OF VESSELS LEAVING SAN FRANCISCO FOR DESTRUCTION OF RATS.

Because of the danger of the disease spreading to other cities through the medium of vessels, telegraphic orders were issued on August 24 to the United States quarantine officer in San Francisco instructing him to direct all vessels leaving San Francisco to call at the quarantine stations for inspection on arrival at the various coast ports.

Owing, however, to the rapid increase of cases and to their general distribution, the danger of other ports becoming infected was considered so serious that it was decided to fumigate all vessels leaving San Francisco for any port in the United States, Canada, Mexico, or Hawaii, and on August 26 telegraphic orders to this effect were issued to the United States quarantine officer, San Francisco. This officer was also authorized, in addition to disinfecting, to enforce certain precautions against rats getting on board, to issue certificates covering these points, and to employ an adequate force, professional and nonprofessional, to carry this order into effect.

Acting under these orders, a crew was engaged, the quarantine steamer *Geo. M. Sternberg* was commissioned, a city office secured, and 22 men employed as disinfectors. The barge *Disinfector* was fitted up with sleeping accommodations, equipment for kitchen and dining room was purchased and installed, the barge was anchored near the water front, the disinfecting force was put on her, together with pots, pans, and sulphur, which had also been procured, and on September 2, 1907, the work of disinfection was begun.

The following details are taken from the report of Passed Asst. Surg. W. C. Hobdy, in command of the quarantine station, San Francisco:

The primary end to be attained, viz, to prevent the spread of plague by vessels carrying infected rats, naturally divided the work in the beginning in two parts—to destroy the rats then on shipboard and to prevent others from gaining access to the vessel. To this end a circular letter, dated August 31, was sent to all interested parties, informing them that all vessels leaving San Francisco must be fumigated, observe certain precautions at dock afterwards, and, finally, procure from the United States quarantine officer a certificate covering these points. This same circular outlined the necessary precautions to be observed, and with the commencement of the work two temporary acting assistant surgeons were employed, one to assist in the fumigation and the other to see that these precautions were observed.

In the beginning the attempt was made to fumigate these vessels at their respective docks, but the number to be treated was so great and the water front so extended that this could not be done. An anchorage was set apart for the work by the state board of harbor commissioners, the barge *Disinfector* was anchored here, and all vessels, except those leasing and controlling their own docks, were required to anchor in this space for fumigation. It required only a few days to demonstrate that the force as thus constituted was inadequate for the work. The quarantine steamer *Argonaut* was therefore transferred from boarding duty to the fumigation work and the disinfecting force increased from 22 to 40 men. Two acting assistant surgeons had already been appointed for the work and an additional commissioned officer was detailed for duty in this connection.

The task of disinfecting all vessels leaving San Francisco was not only arduous, but it was also complicated by the variety of vessels and the many different conditions and difficulties which had to be met and overcome. Many of these vessels plied only on the bay and its tributaries, such as stern-wheelers, ferryboats, etc., and these came properly under the jurisdiction of the State. Over this class of vessels the service had no authority. Moreover, these vessels, because of their mode of construction, could not be successfully fended off from their docks, nor could any practical precautions be devised that would keep rats off. After a conference with the state board of health, that body gave the necessary authority, furnished two assistants, and in lieu of fending off, since this could not be done, it was decided to fumigate these vessels every fifteen days. This work was done under the supervision of the service, but by assistants furnished by the State, under the State's authority, and at the State's expense.

In the treatment of all other vessels included in the order of August 26, 1907, the work fell naturally under four heads: (1) Fumigation

to destroy rats, (2) necessary precautions to keep rats off, (3) regular inspections to show that these precautions were being observed, and (4) issuing a proper certificate showing that all these conditions had been complied with.

(1) The fumigation consisted of a simultaneous exposure throughout to sulphur dioxide, $2\frac{1}{2}$ per cent strength, for a period of five hours. This percentage of gas was obtained by the pot and pan method of burning sulphur, and this strength, with five hours' exposure, was found thoroughly effective.

(2) The precautions enforced consisted of (*a*) fending off 6 feet from the dock, (*b*) wearing funnels on all lines, and (*c*) raising the gang plank from the dock at night. In fending off, spars were not allowed; owing to the amplitude of the tide they were found impractical. Pontoons 6 by 15 feet, which float and are independent of the tide, were required. The funnels had to be not less than 36 inches in diameter, with the shank or tube prolonged, so that by serving this closely to the line the perimeter would be kept at all its points equidistant from the line encircled.

Inasmuch, however, as all precautions at best are so liable to error that they can never be absolutely effective, it was decided to enforce those mentioned, and at the same time to disinfect the vessels every thirty days to kill any rats that might have gotten on board in the meantime.

(3) In order that the officer issuing the certificate might have for his guidance definite information concerning the observance of the precautions, launch hire was authorized, and twice each day the entire water front was inspected and a report made as to the manner in which every vessel was observing these requirements. A written record was kept of these daily reports, and also a record of the date of fumigation of every vessel. These records were referred to and guided the officer in issuing or withholding the certificate when the vessel was ready to sail.

(4) This certificate was for the information of the quarantine officer at the vessel's destination. It showed the date of last fumigation, named every compartment treated, gave the length of exposure, the strength of the gas, and stated what precautions had been observed. From San Diego to Seattle a service representative is stationed in every port of any importance. To each of these officers a circular letter was sent, stating that uncertified vessels from San Francisco were dangerous and should be held and disinfected. These officers had previously been instructed to inspect all vessels arriving from San Francisco. With their cooperation in this way, coupled with the daily inspections of the water front in San Francisco, little trouble was experienced in having the vessels observe the required precautions.

The work was further complicated by the large number of vessels which discharged part of their cargo in Oakland. This territory, being infected, was also in charge of a service officer, and vessels were required to observe the same precautions there as on the San Francisco side. Vessels clearing for Oakland were required to procure from the United States quarantine officer the certificate already described before sailing. On arrival in Oakland a service inspector

demanding this certificate, enforced the precautions, and then noted this fact on the certificate prior to the vessel's return to San Francisco. When ready to sail from San Francisco to outside ports if this certificate, properly viséed, was not produced, the vessel was disinfected.

Another of the difficulties to be overcome was that attending the disinfection of oil-carrying boats, of which there were 25 or 30 running regularly in and out of San Francisco. There was a popular and widespread belief that these vessels did not harbor vermin; that because of the nature of their cargo rats either could not or would not live on board, and that fumigation of these vessels, for the same reason, would be particularly dangerous. The latter objection was overcome by doing the work at the service hulk *Omaha*, which is so well equipped with modern, up-to-date machinery (including sulphur furnace) that all danger from fire or explosion was entirely precluded. Over 150 of these disinfections without any accident whatever go to show that the method used was safe. It also demonstrated the fallacy of the belief that rats would not live on this class of vessels, more than 60 being found after one disinfection on some of these "vermin-free" ships.

This method of doing the work was continued without break or interruption of any kind from its inception, September 2, 1907, till May 25, 1908, when, owing to improved conditions in San Francisco, the interval between fumigations was lengthened from thirty to sixty days.

The task thus imposed on the service by the conditions in San Francisco was one of huge proportions. Not only was it difficult merely because of its size, but the difficulties due to this cause were still further increased by the fact that the work was new and interfered with business, and the interested parties therefore could not understand at first the necessity for doing it. In the beginning there was much talk of united opposition to the work on the part of the shipowners' association, and only after addressing these people in a body and explaining in detail the aim of the work, the method of doing it, and the necessity therefor was the officer in charge able to overcome this prejudice and opposition.

The service was well prepared, however, to meet the demands thus suddenly made upon it. The two quarantine steamers *Argonaut* and *Sternberg*, with their respective crews, were transferred to the work, the barge *Disinfector* lent itself readily to the purposes of a floating hotel, and, when equipped, afforded excellent accommodations to the disinfecting crew of 40 men that was promptly installed thereon. So well prepared, in fact, was the service for emergency calls of this nature that within five days of issuing the order the work was organized, equipment procured, men engaged, and the work of disinfecting was proceeding in full swing. It is now, ten months later, still going on, and since the beginning there has not been one single complaint about unnecessary delay. The service has stood ready at all times to do the work, not only properly, but promptly, whether the task was a small bay vessel taking only a few pounds of sulphur or huge ocean liner requiring more than 4,000.

The following figures will give some idea of the volume of work performed to June 30, 1908:

Vessels disinfected, 2,796, an average of 9 for every day, Sundays and holidays included, since the work was begun; sulphur consumed, 620,000 pounds; alcohol consumed, 4,342 gallons.

In the beginning of the work it was not at all uncommon to destroy more than a hundred rats on a vessel at one fumigation. A few over 500 in one case and a few over 300 in another were the highest numbers reached. After the third or fourth fumigation of a vessel, however, there was a decided falling off in the number destroyed, and from that time on the vessel would be found practically, though not entirely, vermin free. The good work did not stop with the rat population, either. It is a matter of constant comment and congratulation that the vessels generally are now entirely free from mice, bed-bugs, water bugs, cockroaches, or other vermin.

But the good results did not stop here. They have been much more far-reaching in their effect. There is not a single record of a case of plague traceable to San Francisco having occurred in any one of the many cities or towns, either up or down the coast or around the bay, since this work was begun. When it is remembered that during all this time communication with all these places was practically uninterrupted, that since beginning the work more than half a dozen cases of plague have been taken from vessels in the bay, that during a great part of the time there has been a high percentage of infection among the rats of San Francisco, particularly along the water front, the imminent danger of the disease spreading can be understood and the inestimable value of the work of the service in preventing its spread will be appreciated.

While the service with the one hand grappled with and throttled the disease in San Francisco, with the other it effectually protected the entire remainder of the coast from the spread of the disease.

PLAGUE CAMPAIGN IN OAKLAND.

On September 12, 1907, a case of plague occurred in Oakland in the person of a white woman residing at the Hotel Arlington. The outbreak in that city lasted until December 15, 1907, twelve cases being reported in all. In Oakland, as in San Francisco, the foci of infection were widely separated and apparently not connected in any way. These facts may be taken as an indication that the disease had been prevalent in this vicinity for a longer time than is generally supposed.

On the invitation of Doctor Foster, secretary of the state board of health, Doctor Blue met the mayor and the health officers of Oakland and the suburban towns in consultation September 18. As a result of the consultation Oakland, Berkeley, Port Richmond, and Alameda decided to appropriate funds for a defensive campaign against the disease. The city council of Oakland allotted \$10,000 per month for the prosecution of the work, and requested the detail of an experienced officer to take charge. Passed Asst. Surg. John D. Long, then stationed at the United States Marine Hospital in San Francisco, was directed by the bureau to assume charge under the direction of Passed Assistant Surgeon Blue.

The work in Oakland has been practically the same as that in San Francisco, except in regard to the rat-proofing of buildings. It is to

be regretted that the excellent sanitary laws recently enacted by the council were not put into effect at an earlier date.

An earnest warfare, consisting of trapping and poisoning, has been carried on against rodent life since October 1, 1907. A capitation fee of 5 cents was also paid for such animals delivered at the health office. Owing to the lack of suitable ordinances the work of destroying harboring and nesting places and the rat-proofing of buildings did not begin until the end of the fiscal year. During the fall and winter most of the bacteriological work was done in the laboratory of the local board of health by the city bacteriologist, but later the service found it necessary to install a laboratory of its own and to place Acting Assistant Surgeon Wherry in charge of such work.

The conditions which may be said to favor the spread and continuance of plague in Oakland, while not so grave as those found in San Francisco, are sufficient to tax the financial resources of a larger and richer community. It is a city of wooden foundations, with an extensive water front, which, on account of faulty construction, can not be easily defended against an invasion of this nature. The scavenging is imperfectly done by private parties, and the city does not own a plant for the incineration of garbage. Up to May all refuse was hauled in open carts to a free dump, located in marshy ground near the water front. The campaign for cleanliness, led by Doctors Long and Ewer, has changed these conditions markedly—a health conscience has been developed among the people, a contract let for hauling all refuse to sea, and plans and specifications for a destructor plant called for by the council.

Doctor Long reports that the amount of garbage collected daily since the beginning of the inspection has been more than doubled. The total amount of money appropriated by the city council for special plague sanitation from October, 1907, to June, 1908, was \$65,000. Following is the report of the work done in that period:

Summary of work in Oakland, October, 1907, to June 30, 1908.

Total number of plague cases	12
Total number of cases verified bacteriologically	10
Total number of cases verified clinically	2
Number of sick inspected	6, 032
Plague	10
Suspicious	17
Negative	6, 005
Number of dead inspected	1, 376
Plague	2
Suspicious	16
Negative	1, 358
Number of contacts inspected	22
Number of premises inspected	134, 867
Number of houses disinfected	257
Number of houses destroyed	1
Number of nuisances abated	16, 198
Number of notices served	1, 808
Number of ships inspected	194
Number of ships fumigated	12
Number of certificates signed	24
Number of rats found dead	2, 848
Number of rats trapped	37, 756
Number of blocks covered with Danysz's virus	10
Number of poisons placed	2, 615, 816

The following table shows the number of plague rats and the number of cases and deaths from human plague from September, 1907, to November, 1908, inclusive:

STATEMENT OF PLAGUE IN OAKLAND, CAL., FROM SEPTEMBER, 1907, TO NOVEMBER 30, 1908.

	Plague rats.	Human plague.	
		Cases.	Deaths.
1907.			
September	0	12	7
October	2		
November	1		
December	0		
1908.			
January	0	0	0
February	49	0	0
March	44	0	0
April	28	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	1	0	0
November	0	0	0
Total (1907-8)	125	12	7

PLAGUE MEASURES IN ALAMEDA.

The attitude of the health authorities of Alameda in respect to the adoption of antiplague measures can not be commended. Having promised full cooperation and ample funds for a crusade against insanitary conditions in October, they authorized the health officer to employ only 1 sanitary inspector and 4 rat catchers for a short period. The rats captured were not examined bacteriologically by an expert. The garbage is disposed of in an open dump near the city, to which rats and other predatory animals have free access.

Through the efforts of Doctors Foster and Long, who visited the incorporated towns in the counties of Alameda and Contra Costa, the interest of the people was aroused, and steps taken to prevent the spread of plague to them. Inspectors and rat catchers were employed for several months in Point Richmond, Emeryville, and Haywards, and the results attained have been satisfactory. Extra medical inspectors were also employed by the supervisors of the counties of Alameda and Contra Costa. No plague-infected rats have been found so far in the above-mentioned places. One human case occurred at Point Richmond in November, 1907, and one—a Japanese—near Stege, in Contra Costa County.

PLAGUE MEASURES IN BERKELEY.

The citizens of Berkeley in April raised the sum of \$10,000 to be used in plague-suppressive measures. A force of inspectors and laborers was employed under the direction of Doctor Long, and satisfactory results obtained in the number of inspections made, nui-

sances abated, and rats destroyed. It is believed that the council will, in the near future, make ample provision in the tax levy for the construction of a suitable garbage crematory. The method of disposal in use at present consists in dumping on vacant lots in the suburbs.

The following statistics give a summary of the work done under Doctor Blue's direction in Point Richmond, Emeryville, and Berkeley to June 30, 1908:

Number of plague cases in Berkeley (Clinically verified)-----	1
Number of plague cases in Port Richmond (Clinically verified)-----	1
Number of sick inspected-----	868
Plague-----	2
Negative-----	866
Number of dead inspected-----	201
Plague-----	0
Negative-----	201
Number of premises inspected-----	10,393
Number of houses destroyed-----	2
Number of houses disinfected-----	16
Number of nuisances abated-----	1,930
Number of notices served-----	268
Number of rats found dead-----	2,982
Number of rats trapped-----	8,164
Total rat catch-----	11,146
Number of rats examined bacteriologically-----	270
Number of poisons placed-----	390,221

In Contra Costa County there was, in July, 1907, 2 cases and 2 deaths from plague; 1 in Concord, and 1 in Prenoio Valley. There was also 1 case in November, 1907, at Point Richmond. There have been no cases since the above dates, and there have been no plague rats found.

PLAGUE IN SEATTLE.

On account of the occurrence of three cases of plague in Seattle during the month of October, 1907, the service was requested by the governor of the State of Washington and by the mayor of the city of Seattle to assume the direction of measures for the eradication of the infection.

On October 22, 1907, the following telegram was received from the governor of the State of Washington:

SEATTLE, WASH., October 22, 1907.

SURGEON-GENERAL,

Public Health and Marine-Hospital Service,

Washington, D. C.:

, Mayor of Seattle advises me that one death from bubonic plague has taken place there, and forwards request of city board of health that I ask your service to take charge of the prophylactic measures that may be necessary to stamp out the disease at its inception, which request I respectfully and earnestly make.

ALBERT E. MEADE,
Governor of Washington.

October 24 the following telegram was sent to Governor Meade:

After consultation with Assistant Secretary Treasury, in response to your telegram 22d, received this morning, Passed Assistant Surgeon Cofer will be ordered to Seattle as representative of service in Seattle and Puget Sound territory. Doctor Cofer has had large experience with plague at Honolulu. Passed Assistant Surgeon White, already in Seattle, has also had large experience with plague. Pending Cofer's arrival, Doctor White has been directed to confer with mayor in advisory capacity and to make known to bureau necessities of situation. Additional officers will be sent if needed. Same arrange-

ments will be necessary with regard to expense as have been made in San Francisco and Oakland, and in New Orleans during yellow fever epidemic. That is, labor and material required will be furnished by state or local authorities, the department furnishing necessary professional force, including laboratory if required.

To the above telegram the following reply was received:

SEATTLE, WASH., *October 24, 1907.*

SURGEON-GENERAL, UNITED STATES PUBLIC HEALTH AND MARINE-
HOSPITAL SERVICE,
Washington, D. C.:

The State of Washington and the city of Seattle will supply to the United States Public Health and Marine-Hospital Service all the men, money, and material necessary for the immediate suppression and eradication of the bubonic plague within their boundaries.

ALBERT E. MEADE, *Governor.*

WM. HICKMAN MOORE, *Mayor.*

An experienced commissioned medical officer was immediately ordered to Seattle with instructions to inaugurate a campaign against the plague infection existing in the city of Seattle proper, and to extend the work if necessary to other cities in the State of Washington should the infection spread thereto.

The following is taken from the report of Passed Asst. Surg. L. E. Cofer, who was detailed to represent the service at Seattle:

THE EXTENT OF THE INFECTION.

Bubonic plague was discovered in Seattle during the month of October, 1907.

Three human cases, one of the bubonic type and two pneumonic, occurred between October 16 and 25. Since October 25 there have been no further human cases. At the time of the appearance of the disease, one rat infected with plague was found. Eleven other infected rats have been found since that date. The source of infection was probably San Francisco, although this can not be proven. The three human cases apparently originated from two separate foci and between these no connection was ever demonstrated.

The service work in Seattle, directed especially to the suppression of plague, was inaugurated on November 9, although much valuable sanitary work had already been accomplished by the emergency corps authorized by the city council.

This work was immediately merged into the service work, so that the whole system of sanitary policing and rat extermination was conducted by the service representative, with the assistance of a special health officer appointed by the mayor of Seattle.

Our present knowledge of plague naturally suggested a certain permanency to the work in hand, and on these lines the equipment was provided.

Having decided upon an organization which should be directed from a central office through district departments, a building was hurriedly constructed for the purpose. This building contained rooms for executive and clerical work, quarters for the service bacteriological laboratory, morgue and necropsy room, animal barn, and poison manufacturing and distributing depot.

The operating divisions comprised one for the disinfection of vessels, one for bacteriology, one for medical inspection and reports, and one for special municipal policing.

The expense of the campaign was apportioned as follows: The Public Health and Marine-Hospital Service furnished the funds for medical supervision, bacteriological service, and men and material for the disinfection of ships. The city of Seattle supplied the necessary men and material for the municipal sanitary work.

GENERAL PLAN OF CAMPAIGN.

It was found after a general inspection of the city of Seattle that the bulk of policing and general sanitary work would be confined to about 218 city blocks. The work was carried on, however, in a minor degree over the entire city.

In the work of rat extermination it was decided to include the whole city.

The disinfection of vessels was limited to vessels leaving Seattle for Puget Sound and Alaskan ports.

Vessels plying between Seattle and San Francisco are regularly disinfected at the latter place.

THE WORK OF THE OPERATING DIVISIONS.

The division for the disinfection of vessels is under the charge of a medical officer of the service.

The bacteriological division is likewise under the charge of a medical officer of the service. At the laboratory rats both dead or alive are received daily and examined bacteriologically. Each rat or collection of rats, as the case may be, bears a card stating as accurately as possible the locality where found.

All bodies of persons dying under suspicion of plague are brought to the morgue, where necropsy is performed. The division of medical inspection and reports was subdivided into six sections, each under an acting assistant surgeon. These medical officers were in immediate charge of the policing, rat-catching, and poisoning squads. A systematic policing of premises was carried on under the immediate supervision of the medical officers, together with a house-to-house inspection of the occupants of houses.

Detailed maps of every city block of importance from a sanitary standpoint were drawn and filed in book form where they were easily accessible for reference. The districts were repeatedly inspected in order to insure constant compliance with the sanitary rules.

The inspections were covered by typewritten classified reports on the rubbish and garbage disposition, on plumbing irregularities, and on general nuisances. Every landlord was given a written order to comply with the ordinances in detail, and the failure to comply with said order was made the subject of a special report which was forwarded to the chief of police for action.

An attorney at law was employed for the purpose of enforcing the following ordinances which were passed by the city council of Seattle shortly after the outbreak of plague.

ORDINANCE No. 15957, OF SEATTLE.

SEC. 13. It shall be unlawful for any person to have or permit upon any premises owned, occupied, or controlled by them any nuisance detrimental to health, or any accumulation of filth, garbage, decaying animal or vegetable matter, or any animal or human excrement, and it shall be the duty of the health officer of

the city of Seattle to cause any such person to be notified to abolish, abate, and remove such nuisance, and in case such person shall fail, neglect, or refuse to remove the same within three (3) days after receiving such notice, such nuisance may be removed and abated under and by order of the health officer, and the person whose duty it was to abate or remove such nuisance, in addition to incurring penalties in this ordinance provided, shall become indebted to the city of Seattle for the damages, costs, and charges incurred by the city by reason of the existence and removal of such nuisance:

SEC. 17. It shall be unlawful for any person to dump or place upon any land, or in any water or waterway, within the city of Seattle, any dead animals, butchers' offal, fish or part of fish, or any waste vegetable or animal matter whatever; and the board of public works is hereby authorized to offer a reward of fifty (\$50) dollars to any person furnishing evidence that will lead to the arrest and conviction of any person depositing the body of any dead animal in any water or waterway within the city of Seattle.

SEC. 21. It shall be unlawful for any person, whether the owner, lessee, occupant, or agent of any premises, to keep or permit to be kept in any building, area way, or upon any premises, or in any alley, street, or public place adjacent to any premises, any waste animal or vegetable matter, dead animals, butchers' offal, fish or part of fish, ashes, swill or refuse matter from any restaurant, eating place, residence, place of business, or other building, unless the same be collected and kept in a tightly covered or closed metal can or vessel, which can or vessel shall have firmly attached to the body thereof a metallic tag or label bearing the name or names of the owner or owners thereof, and the number of the premises in connection with which such can or vessel is being or is intended to be used.

SEC. 53. Any person violating or failing to comply with any of the provisions of this ordinance shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine in any sum not exceeding one hundred (\$100) dollars, or by imprisonment in the city jail not exceeding thirty (30) days, or by both such fine and imprisonment.

THE WORK OF RAT CATCHING IN SEATTLE.

This work was attended in Seattle with many serious difficulties, not only because of the bad sanitary condition of the city, but owing to the topography of the latter. The lower or business portion of Seattle is built for the most part upon piles, and the resulting area of dark space below the houses furnishes an unlimited harbor for rats.

The city of Seattle is practically being regraded. Hills are being cut down and the material deposited upon the lower levels, raising these from 20 to 50 feet. The houses are being elevated on piles to a similar height in the lower portion of the city, which together with the work of cleaning up refuse, destroying old buildings, and poisoning and trapping rats, served to scatter the rats over the city. Householders in sections hitherto comparatively free from rodents reported the presence of large numbers of rats in their neighborhoods.

Fortunately the infection in rats was not general. The crusade against the rodents was nevertheless extended so as to include the whole city. A bounty of 10 cents was paid for each rat delivered at the laboratory. In addition to this regular rat catchers were employed. Each rat on being received was tagged as to the locality where caught, submerged in kerosene oil whether alive or not; then fastened to a shingle and dissected. If appearances were suggestive of bubonic plague, a smear of the spleen, liver, and lymph nodes was made and examined, and cultures made and animals inoculated.

The laboratory equipment was provided by the service, having been sent from the Jamestown Exposition for the purpose.

Especial attention was given to the flea count on rats. Flea counts in the laboratory showed that the number of fleas per rat dropped from 15 to 20 per rat in November to 6 fleas in 14 rats in February.

On the whole the flea count was reported as having varied very much. Some lots of rats averaged less than 1 flea to a rat, while the highest count was 68 fleas to one lot of 8 rats. The greatest majority of rats found in Seattle belonged to the species *Mus decumanus*, although a few of the species *Mus rattus* were received.

THE SANITARY POLICING OF SEATTLE.

An inspection of the city of Seattle demonstrated the fact that before an effective campaign against rats could be inaugurated a general cleaning up of the city was absolutely necessary; this to reduce to a minimum all possible food supply for the rats.

The most serious difficulty encountered was the disposal of garbage. The method of disposal in vogue was the collecting of garbage and waste by a draying and trucking corporation at a monthly rate for each householder. Failure to pay this tax simply resulted in the garbage being left upon the premises, a penalty which operated against an easy solution of this important problem.

Some parts of the city were completely neglected, and the depositing of garbage and waste on open lots and even in public streets was not unusual.

The correction of these conditions required an energetic campaign.

An acting assistant surgeon was placed in charge of a definite district and given the requisite men and teams for removing all garbage and rubbish, and men for the wholesale poisoning of rats.

Every householder was required to provide himself, if this had not already been done, with a galvanized-iron garbage can with a proper lid. The result of these measures may be demonstrated by the following table, showing the increase in the garbage disposal during the months indicated. These figures are taken from the report of Assistant City Engineer C. T. Moore, of Seattle:

	Tons per month.	Loads per day.	Per cent of increase over September.
1907.			
September.....	4,019	92	-----
October.....	4,553	94	11
November.....	6,056	116	50
December.....	5,646	112	40

There was on the city dump, December 31, 5,200 tons of rubbish over the normal, which demonstrated the stimulus which the emergency organization gave to the regular municipal-garbage service.

Early in December a special inspector was detailed to visit all meat markets and delicatessen stores with reference to enforcing the municipal ordinance requiring such establishments to be made rat proof. All markets were required to have metal-lined boxes with covers as scrap boxes. They were also required to have all windows and doors protected with $\frac{1}{2}$ -inch wire mesh. The results attained by rat proofing in this manner were highly satisfactory.

FUMIGATION OF SHIPS.

In addition to the measures above described to eradicate plague from Seattle, it was necessary to take precautions against the spread of infection to other places. Seattle has an extensive trade with Alaska, British Columbia, and other parts of the State of Washington. This is carried on for the most part by the shipping, therefore it was necessary to fumigate the vessels engaged in this trade in order to destroy rats. A medical officer of the service was placed in charge of this work. Sulphur burned in iron pots was the method used.

From November 7, 1907, to July 1, 1908, 145 vessels were fumigated. This work is still being carried on by the service.

The board of health of the State of Washington, through the secretary, Dr. Elmer E. Heg, rendered invaluable service by means of a circular letter sent to all health officers, both city and county, to county commissioners, and mayors of all cities of the counties bordering on Puget Sound. This circular letter contained many valuable suggestions.

On January 22, 1908, it was decided that conditions in Seattle had improved to a point where an emergency no longer existed. Accordingly the work as a whole was reorganized on a permanent basis. The municipal inspection and policing was turned over to the special sanitation department of Seattle, the United States Public Health and Marine-Hospital Service retaining the pathological and bacteriological work, which included the examination of all rats sent to the laboratory.

The work is being conducted at this writing on lines similar to those described above.

Statistics covering the work performed are divided into two sets, one set covering the period from November 6, 1907, to January 22, 1908, the date on which, as stated above, the work was subdivided, and the others covering the period from January 22, 1908, to July 1, 1908.

Plague-prevention work from November 6, 1907, to January 22, 1908.

City blocks inspected and reported	3, 849
Nuisances abated	2, 017
Cubic yards of rubbish burned	1, 949
Cubic yards of rubbish removed	2, 516
Rats delivered and cremated	15, 475
Rats killed, approximately	25, 000
Rats found infected with plague	2
Pieces of rat poison placed	128, 800
Garbage cans installed	2, 000
Pounds of poisoned wheat placed	150

Transactions of the division of special municipal policing.

Blocks inspected	484
Garbage cans installed	7, 500
Cubic yards of rubbish removed	13, 000
Old buildings destroyed	26

From January 22, 1908, to the end of the fiscal year, June 30, 1908, the work in Seattle, as a whole, has been carried on under principles suggested by the United States Public Health and Marine-Hospital Service. The commissioner of health in Seattle, the special health officer, and the secretary of the Washington state board of health are

now rendering to the medical officers of the service at Seattle constant assistance.

Approximately 25,000 rats have been subjected to necropsy and, when necessary, to bacteriological examination at the service laboratory between January 22, 1908, and the end of the fiscal year. This number, added to the 15,475 examined prior to that time, makes an approximate total of 41,000 rats examined, out of which number to date 11 have been found infected with plague.

Statement of plague at Seattle from date of first appearance, October, 1907, to November 30, 1908.

	Plague rats.	Human plague.	
		Cases.	Deaths.
1907.			
October.....	1	3	3
November.....	0	0	0
December.....	3	0	0
1908.			
January.....	1	0	0
February.....	0	0	0
March.....	3	0	0
April.....	1	0	0
May.....	2	0	0
June.....	0	0	0
July.....	9	0	0
August.....	0	0	0
September.....	1	0	0
October.....	0	0	0
November.....	0	0	0
Total (1907-8).....	21	3	3

PLAGUE AMONG GROUND SQUIRRELS IN CALIFORNIA.

Laboratory experiments have demonstrated that ground squirrels can be infected with plague, and a few cases of such infection have been reported.

In August and September, 1908, three squirrels found dead and one squirrel shot in Contra Costa County, Cal., were the subject of laboratory investigation in the service laboratories at San Francisco and Oakland, Cal. These squirrels all gave positive evidence of plague infection, and from cultures made from them the disease was communicated to other laboratory animals.

At Los Angeles, Cal., on August 5 or 6, a boy was bitten upon the finger by a sick squirrel and was taken sick on the 11th, and his case subsequently pronounced to be plague. Though the squirrel infecting the boy was subsequently destroyed by a dog and cat, a search of the premises resulted in the finding of a dead squirrel on August 21, which squirrel, on examination, presented evidences of plague infection, subsequently confirmed by experiments on laboratory animals. Though an extensive search and numerous examinations have been made in the vicinity of Los Angeles, no more infected animals have been discovered, but on account of the wide distribution of these rodents throughout California, the matter is one that must be considered with grave concern. During the period between August 5 and October 10, in addition to other animals, 423 ground squirrels from Contra Costa County have been the subject of examination.

Three have been found dead and one was shot, as above recounted, but none other than the four thus mentioned have been found infected with plague.

The aid of the Bureau of Biological Survey of the Department of Agriculture was sought for information as to the prevalence of squirrels in California, the habits of the animals, and methods for their destruction. An article by Dr. C. Hart Merriam, Director of the Biological Survey, has been prepared and published in the Public Health Reports, and reprints will be extensively circulated in California and elsewhere, with a view to arousing public sentiment and aiding in a systematic campaign for the destruction of these rodents.

THE PRESENT PANDEMIC OF PLAGUE.

Plague is now in the fifteenth year of its advance throughout the world. Its geographical progress is outlined in a bulletin prepared in the bureau and entitled "The Present Pandemic of Plague." In the lines of march taken since its advance in 1894 from the province of Yunnan, China, it has by gradual expansion spread to all quarters of the globe. Within six years after its revival, plague had reached every continent, and the further extension of the disease became largely a matter of intercontinental diffusion. A total of fifty-two countries have been infected. In some of these countries a few cases only have been recorded, but in others the disease has obtained a firm foothold and caused great mortality.

Limited during the first two years to China, plague extended, in 1896, to India, Japan, and Asiatic Turkey, cases being also reported in Russia. To these countries it remained confined until 1898, when Africa was invaded, Madagascar and Mauritius being the points of attack. In 1899 Arabia, Persia, and the Straits Settlements were added to the list in Asia. The same year an extension in Africa took place and British South Africa, Egypt, the French Ivory Coast, Portuguese East Africa, and the island of Reunion became plague territory. In Europe, in 1899, Russia, Austria, and Portugal were also invaded. The same year Hawaii and New Caledonia suffered their initial attack, and the extension of plague to South America was signalized by outbreaks in Argentina, Brazil, and Paraguay.

In 1900 California suffered its first visitation of plague, so that in that year the disease was lodged in Asia, Africa, Europe, Oceania, North and South America. Since that time statistical studies show a gradual increase in the number of localities visited within the boundaries of the invaded continents.

The world-wide expansion of plague, notwithstanding the practice in many instances of the most carefully planned preventive measures, has led to the preparation in the bureau of an article on "Measures to prevent the introduction and spread of plague," published in the Public Health Report and later reprinted for wider circulation.

In the chapter on sanitary reports, statistics, and publications, of this report, it will be seen that during the calendar year 1908 Venezuela and Ecuador were invaded by plague. Caracas and La Guaira, in the former country, and Guayaquil, in the latter, were the seats of epidemics. Trinidad, where the disease was present in previous years, suffered a renewed outbreak. The proximity of plague to our southern boundaries has necessitated constant vigilance to prevent its further lodgment in the United States.

SCIENTIFIC RESEARCH AND SANITATION.

The operations of the service in the field of scientific research and sanitation have increased during the year. It is becoming more and more recognized that the scientific studies of public health problems and educational measures in relation thereto are the province of the Federal Government.

The routine work of previous years has been continued, and, in addition, new subjects have been taken up for investigation through the bureau Division of Scientific Research and Sanitation.

The various laboratories of the service have been supplied with the necessary facilities for carrying on their work, and, in addition, officers of the service have been encouraged in the study of special problems in conjunction with their regular duties. As a result, a number of important investigations have been made and the findings published in the interest of the public health.

During the year the service was represented at the most important scientific and sanitary associations, and by this means the officers in attendance were brought in contact with the advanced scientific workers in the field of preventive medicine. At the request of certain state health authorities, officers were also detailed to conferences on sanitary questions. In accordance with such a request, the Surgeon-General and the Assistant Surgeon-General in charge of the Division of Scientific Research visited the offices of the state board of health of Indiana, studied their records and the extent of the work done, and, in addition, inspected the milk and water supplies of the city of Indianapolis. Through this and other means the bureau has kept in touch with the sanitary work being done throughout the country.

Requests have been received from certain health authorities for cooperation in the investigation of the transmission and prevention of infectious diseases, notably hookworm disease, typhoid fever, and tuberculosis. While the laboratory work along these lines has been undertaken, it was impracticable to comply in full with these requests in the absence of authority to make investigations other than laboratory in different parts of the country. These experiences emphasize the necessity for the enactment of laws containing such authority.

The work of the bureau through the Division of Scientific Research and Sanitation, with supplemental work in the laboratories and in the field, embraces the following, viz, supervision of the manufacture of vaccines, serums, and toxins; investigations in relation to the pharmacopœia; investigations of typhoid fever in interstate traffic; cooperation with the Lake Michigan Water Commission; investigation of rabies, and treatment in the Hygienic Laboratory of persons bitten by rabid animals; studies of hook-worm disease; studies of pellagra and publication of literature in relation thereto; studies of

milk and its relation to the public health; investigations of devices and appliances advertised for the treatment of diseases; investigation of a case of leprosy in Virginia; studies of leprosy at the national leprosy investigation station in the Territory of Hawaii; analyses of drugs, water, and other public health investigations in the Hygienic Laboratory; aid to the International Congress on Tuberculosis; and aid to state and municipal health officers in the determination of specimens, examinations, and analyses of a public health character.

SUPERVISION OF VACCINES, SERUMS, ETC.

The act approved July 1, 1902, regulating the sale of viruses, serums, and toxins in interstate traffic has been administered as in previous years. The supervision maintained has been of advantage to the manufacturers themselves, and resulted in the continued improvement of the products for which licenses were issued.

Samples of these products have been purchased in the open market as in previous years and examined in the Hygienic Laboratory to determine their purity and potency.

It is known that a great many viruses, serums, and toxins are purchased from licensed firms and distributed by state and municipal boards of health. In carrying out the intent of the law it was desirable to examine the products issued by boards of health as well as those purchased in the open market. Letters were therefore addressed on November 2, 1907, to the state and territorial health authorities offering to examine any samples that they might forward for the purpose. As a result, six States and one Territory availed themselves of this opportunity. Reports of the examinations were made to those forwarding the serums, and where loss of potency was detected the fact was called to the attention of the licensed manufacturers.

During the latter part of the fiscal year 1907 the American agents of a foreign establishment engaged in the manufacture of serums informed the bureau of their intention to apply for a license on behalf of their principles for the importation of their products. In a letter written several months later the agents stated that the manufacturer, having learned that an inspection of their laboratory was a prerequisite to the issue of a license, declined to comply with the requirement of the law in that respect. It appearing, after some correspondence, that the manufacturers would not open their laboratory for inspection, a letter was addressed to the Secretary of the Treasury, Division of Customs, recommending that admission of their products be refused by the customs officers at the ports of entry. The collector of customs at New York was instructed accordingly, and the agents were informed of these instructions.

The manufacturers later consented to an inspection of their laboratory, and on June 3, 1908, a license was issued, and the prohibition on the importation of their products was removed.

In another instance, the bureau was informed that certain viruses were being marketed without a license. The attention of the manufacturer was called to the statute, and he promptly applied for a license, which was issued after due inspection and laboratory examination.

During the fiscal year, 15 establishments were reinspected and relicensed, and 4 additional establishments were inspected and licensed. The following list shows the establishments which received licenses and the products for which licenses were granted:

ESTABLISHMENTS LICENSED.

No. of license.	Establishment.	Products.
1	Parke, Davis & Co., Detroit, Mich.....	Antidiphtheric serum, antitetanic serum, antistreptococcic serum, erysipelas and prodigious toxines (Coley), tuberculin, emulsion tubercle bacilli, antigonococcic serum, anti-tuberculous serum, vaccine virus, and bacterial vaccines.
2	H. K. Mulford Co., Philadelphia, Pa.....	Diphtheria antitoxin, tetanus antitoxin, antistreptococcic serum, antipneumonic serum, antidysenteric serum, antigonococcic serum, tuberculin, vaccine virus, and bacterial vaccines.
3	Dr. H. M. Alexander & Co., Marietta, Pa....	Vaccine virus, diphtheria antitoxin and tuberculin.
5	Fluid Vaccine Co., Milwaukee, Wis	Vaccine virus.
6	The Pocono Laboratories, Swiftwater, Pa....	Do.
8	Cutter Analytic Laboratories, San Francisco, Cal.	Vaccine virus, diphtheria antitoxin, antistreptococcus serum.
9	Frederick Stearns & Co., Detroit, Mich.....	Diphtheria antitoxin, streptolytic and pneumolytic serum, and vaccine virus.
11	Pasteur Institute, Paris, France	Antidiphtheric serum, antitetanic serum, antistreptococcic serum, and antipest serum.
12	Chemische Fabrik auf Actien (vorm. E. Schering), Berlin, Germany.	Antidiphtheric serum and antistreptococcic serum.
14	Health Department of the city of New York.	Diphtheria antitoxin.
15	W. R. Hubbert's Serum Laboratory, Detroit, Mich.	Do.
16	National Vaccine and Antitoxin Establishment, Washington, D. C.	Diphtheria antitoxin and vaccine virus.
17	Lederle Antitoxin Laboratories, New York.	Diphtheria antitoxin, tetanus antitoxin, bacterial vaccines, and vaccine virus.
18	Burroughs, Wellcome & Co., London, England.	Antidiphtheric serum, antistreptococcic serums, antistaphylococcic serum, and antityphoid serum.
19	Memorial Institute for Infectious Diseases, Chicago, Ill.	Diphtheria antitoxin.
21	Swiss Serum and Vaccine Institute, Berne, Switzerland.	Antitetanic serum, antidiphtheric serum, antidysenteric serum, antipneumococcic serum, antimeningococcic serum, antiplague serum, antistreptococcic serum, tuberculin, and vaccine virus.
22	Institut Bacteriologique, Lyons, France....	Antidiphtheric serum and antitetanic serum.
23	Bacterio-Therapeutic Laboratory, Asheville, N. C.	Tuberculins.
24	Farbwerke vormals Meister Lucius and Brüning, Hoechst-on-Main, Germany.	Antidiphtheric serum, antitetanic serum, antistreptococcic serum, antimeningococcic serum, antidysenteric serum, and tuberculins.

That all possible care should be taken for the exclusion of the tetanus bacillus from all biologic products, a letter was addressed on May 5, 1908, to all manufacturers of viruses, serums, and toxins holding licenses from the Treasury Department. In this letter attention was called to an article appearing in the Journal of the American Medical Association of March 21, 1908, entitled "Some neglected facts in the biology of the tetanus bacillus; their bearing on the so-called biologic products." It was recommended that certain points be observed in the preparation of biological products under this law, as follows:

- (1) Tetanus spores are not necessarily killed after three exposures to boiling temperature;
- (2) the necessity for examining each flask of diphtheria growth microscopically before injecting it into horses;
- (3) the importance of using the autoclave as a means of sterilizing media, containers, etc.;
- (4) the importance of making anaerobic tests in fermentation tubes containing pieces of animal

tissue at various stages of the process in the manufacture of each biological product for use in man, in order to determine the presence or absence of tetanus or anaerobic spores; (5) the importance of controlling the method of sterilization from time to time with tetanus spores, to insure the satisfactory working of the process.

VACCINE VIRUS.

Numerous samples of vaccine virus bought upon the open market during the year were examined bacteriologically in the Hygienic Laboratory with special reference to the number and kind of contaminating organisms. Particular attention is always given to the presence or absence of the tetanus spore or its toxins. For this purpose both cultures and animal inoculation are resorted to. In addition, children are vaccinated to determine the potency and character of the take. These examinations have disclosed the fact that the quality of vaccine virus continues good.

Since March 13, 1906, manufacturers of vaccine virus have been required to make a special examination of every lot of their products, to determine the absence of the tetanus bacillus. The director of the laboratory reports that in spite of searching examinations made for the tetanus bacillus this organism has not been isolated from any sample of vaccine virus examined in the laboratory.

ANTIDIPHTHERIC SERUM.

The standardization of diphtheria antitoxin has now become a matter of routine in the Division of Pathology and Bacteriology of the Hygienic Laboratory. The standard unit is dispensed officially to licensed manufacturers and laboratories especially interested. Packages of diphtheria antitoxin purchased upon the open market are examined for both potency and purity, and show that the diphtheria antitoxin found upon the American market is of good quality, contains at least the strength claimed for it, and may be relied upon to produce its maximum effect if given early in the disease.

During the year a number of samples of diphtheria antitoxin were received at the bureau from physicians and forwarded to the laboratory for examination. The reports of certain of these physicians regarding sudden death following the use of diphtheria antitoxin were recognized as having an important bearing on the use of this specific remedy.

The results of the examinations in the Hygienic Laboratory showed that the serums were free from bacteria contamination, and in view of the previous work done along this line in the laboratory, it was evident that the untoward symptoms reported were not attributable to diphtheria antitoxin itself, but showed that the patients were in all probability sensitized in some as yet unknown way to horse serum. The phenomenon of hypersusceptibility has received very careful study, and it can positively be stated that diphtheria antitoxin plays no part in the poisonous action of horse serum. The symptoms following spaced injections of horse serum in animals are very characteristic and indicate that the poisonous principle has a powerful influence upon the respiratory center. Paralysis of the respiratory centers is evidenced by the fact that respiration in fatal cases ceases long before the heart stops beating.

Similar symptoms were reported in the human cases under consideration. It is significant that certain of the patients reported were afflicted with asthma, which disease is regarded as a neurosis. The fatal results in these cases may furnish important clinical information to the effect that diphtheria antitoxin should not be used, or only with caution, in persons with asthma or subject to asthmatic attacks.

ANTITETANIC SERUM.

In the annual report for 1907, page 26, is set forth the necessity of a standard unit for measuring the strength of tetanus antitoxin, and reference is made to the work which had been carried on in the Hygienic Laboratory for the purpose of preparing a standard toxin. The work is described in detail in Hygienic Laboratory Bulletin No. 43, issued March, 1908, under the title, "The Standardization of Tetanus Antitoxin." As a result of these investigations, the standard unit for antitetanic serum was officially adopted by Department Circular No. 61, October 25, 1907, providing an amendment to the regulations for the sale of viruses, serums, and toxins, under the act of July 1, 1902.

The standard unit is defined as ten times the least amount of serum necessary to save the life of a 350-gram guinea pig for ninety-six hours against the official test dose of the standard toxin prepared in the Hygienic Laboratory. This official test dose is a dried tetanus toxin prepared and sent out from the Hygienic Laboratory from time to time to licensed manufacturers and others concerned.

Before the Government established a standard for measuring the strength of antitetanic serum most of the serum on the market was very weak, and the products of the different manufacturers varied exceedingly in the number of units claimed. Since the adoption of the standard unit above mentioned, all antitetanic serum has been required to conform thereto. These serums are examined to determine their freedom from tetanus toxin as well as for the amount of preservative present. The director of the Hygienic Laboratory reports that all of the samples examined have been found satisfactory except one, which contained less than the number of units claimed. He also reports that the antitetanic serum offered for human use is of much higher potency than the serums used for veterinary purposes. Samples of the latter were examined in the Hygienic Laboratory and the strongest was found to contain about 50 units per cubic centimeter. This is a striking illustration of the value of the control of these products, and it is evident that the antitetanic serum intended for human use, found in the American market, is of decidedly greater antitoxic value than heretofore.

EXAMINATION OF OTHER THERAPEUTIC SERUMS.

During the year a number of samples of other vaccines and serums used for therapeutic purposes were examined in the Hygienic Laboratory. There being no standard for these serums they were examined for freedom from contamination and the amount of preservative. All samples examined during the year were found satisfactory in this respect. A separate report of each examination was made by

the director of the laboratory for consideration of the bureau sanitary board in making recommendations with respect to the granting of licenses under the law of July 1, 1902.

STANDARDS FOR ORGANO-THERAPEUTIC PRODUCTS.

The number and importance of viruses, serums, toxins, and analogous products used for the treatment of diseases of man is constantly increasing. In order to satisfactorily administer the law regulating the manufacture and sale of these products in interstate traffic, it is imperative to establish standards by which they may be measured. The necessity of such standards especially applies to organo-therapeutic products, some of which are now recognized as of great value in the treatment of disease. This work presents many difficulties, but it is clearly a function of the bureau in the interest of the public health, and the Hygienic Laboratory is well equipped for studies of this character.

Much work has already been done in the Division of Pharmacology of the Laboratory with the view to standardizing thyroid preparations and extracts of the suprarenal gland. It is expected that the reports of these investigations will be issued in the near future, and that they will contribute to a better understanding of the strength and uses of these preparations.

Reliable standards for the alkaloids and active principles of vegetable substances are also demanded, and work is now being done in the laboratory, particularly with reference to digitalis.

TUBERCULOSIS.

In accordance with executive order of February 28, 1906, three employees of the various departments in Washington were examined in the Hygienic Laboratory for tuberculosis. One of these employees was reported as having the disease.

Material has been collected for use in antituberculosis work, and an officer of the service, in addition to his regular duties, has given lectures and in other ways carried on educational work, which is regarded as the most important measure in the warfare against tuberculosis.

In the Hygienic Laboratory investigations of tuberculosis included various phases of the subject. The thermal death point of the tubercle bacillus was redetermined by the director, and it was found that 60° C. for twenty minutes is sufficient to kill the tubercle bacillus under ordinary circumstances. The general impression prevails that the tubercle bacillus is much more resistant to heat than other nonspore-bearing bacteria. This has been found not to be the case, unless the bacillus is encapsulated in protecting envelopes of fatty or mucous material, which may act as insulators.

Experiments to determine the presence and frequency with which the tubercle bacillus contaminates market milk and the best ways of finding it were made by the Assistant Director of the Laboratory, and it was found that of 104 dairies whose milk was examined, about 11 per cent were distributing milk containing the tubercle bacillus. Studies have been continued along this line to determine the best method used in detecting tubercle bacilli in market milk.

Experiments upon immunity to tuberculosis in its relation to anaphylaxis have opened promising fields for investigation. In his report the Director of the Hygienic Laboratory expresses the belief that the condition of hypersusceptibility throws considerable light upon the defenses of the body against the infection of tuberculosis.

The director and the assistant director have inaugurated a large series of experiments to determine the channels of infection in tuberculosis. They have also done a large amount of work to determine the effect of the ingestion of dead tubercle bacilli upon the susceptibility of animals to tuberculosis.

The ophthalamo-tuberculin reaction was the subject of careful research in the laboratory. It was found by experimentation upon a number of the personnel that the normal conjunctiva of a nontuberculous individual may be sensitized by the instillation of tuberculin. The reaction to a second injection is accelerated as to time and accentuated as to severity. This is an example of local anaphylaxis and shows that when the tissues are in such a state of hypersusceptibility all nature's protective agencies may be concentrated upon the place where they are most needed. Thus, should a tubercle bacillus fall upon the conjunctiva in a state of hypersusceptibility, it would at once be attacked by the germicidal substances contained in the inflammatory exudate, and at once be prepared for the phagocytic action of the cells.

Studies upon tuberculosis will be continued in the hygienic laboratory and at other stations of the service where patients afflicted with the disease present themselves for treatment, and it is hoped that provision will be made for field investigations of tuberculosis, particularly with respect to its influence on interstate commerce.

TYPHOID FEVER.

In the annual report for 1907, page 21, reference is made to the spread of typhoid fever in interstate traffic, especially the outbreak of this disease which occurred in August, 1907, on the steamship *Northwest*, plying between Buffalo and Duluth. Reports received from officers of the service stationed at ports on the Great Lakes demonstrated the necessity of sanitary surveillance of vessels thereon engaged in interstate traffic to prevent their disseminating this infectious disease.

The law of February 15, 1893, section 3, authorizes the Secretary of the Treasury to promulgate interstate-quarantine regulations, as well as maritime regulations. Certain interstate-quarantine regulations were issued soon after the law was enacted, but they relate only to the epidemic diseases—cholera, yellow fever, smallpox, and bubonic plague.

It was believed, in view of the epidemics referred to above, that regulations should be issued in accordance with this law, having for their object the prevention of the transmission of typhoid fever by vessels and trains engaged in interstate traffic. One of the difficulties encountered heretofore in the administration of interstate-quarantine regulations is due to the fact that the law provides no penalty for their infraction. The original law of February 15, 1893, provides no penalty at all, but it was subsequently amended, providing a

penalty for the violation of regulations issued thereunder relative to maritime quarantine.

There is as yet no penalty provided for the violation of interstate-quarantine regulations promulgated under this law, and with the view to rendering such regulations effective the following bill was prepared and introduced in the House of Representatives:

AN ACT To amend the act approved February 15, 1893, entitled "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service."

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the act approved February fifteenth, eighteen hundred and ninety-three, entitled "An act granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service," is hereby amended by adding the following section:

"SECTION 13. That when any common carrier, or officer, agent, or employee of any common carrier, or any other person shall willfully violate any of the provisions of this act or any of the rules and regulations promulgated thereunder by the Secretary of the Treasury to prevent the introduction of contagious or infectious diseases into one State or Territory or the District of Columbia from another State or Territory or the District of Columbia, such common carrier, officer, agent, employee, or other person shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof in any district court of the United States within the jurisdiction of which such offense was committed, be subject to a fine of not more than five hundred dollars, or imprisonment for not more than two years, or both, in the discretion of the court."

This bill, however, was not acted upon during the first session of the Sixtieth Congress, although it is hoped favorable action may yet be taken at its next session. In the meantime, the following interstate regulation was prepared:

The water intended for drinking, culinary, and lavatory purposes on trains and vessels engaged in interstate traffic shall be taken only from sources of known purity; its character to be certified to by the local health authority; and in the absence of such certificate only distilled water shall be used.

This regulation was submitted at the conference of state and territorial health officers with the Public Health and Marine-Hospital Service held April 27, 1908, and in accordance with the advice received at this conference the regulation will be revised and eventually promulgated, provided authority is granted to insure its enforcement.

POLLUTION OF INTERSTATE WATERWAYS.

In the meantime, the waters of the Great Lakes and many of our streams are being constantly polluted by the sewage of cities and towns along their borders, thereby predisposing to typhoid fever and other water-borne diseases.

Recognizing that this state of affairs was particularly true of Lake Michigan, Dr. W. A. Evans, commissioner of health of Chicago, in a letter dated March 19, 1908, addressed to the city council, invited attention to the necessity of concerted action on the part of the States bordering on Lake Michigan with the view of preventing pollution of the water. He stated that the water of Lake Michigan is being used unfiltered for drinking purposes by a large number of people residing in the adjoining States, and that there is being emptied into the lake untreated sewage. As Chicago is the largest user of this water and, next to Milwaukee, pours more sewage into the

lake than any other city, he recommended that the mayor of Chicago arrange for a commission, to be composed as follows: One from the Public Health and Marine-Hospital Service; one from the War Department; three from Chicago, to be appointed by the mayor; two from Milwaukee, to be appointed by its mayor; one from Grand Rapids, Mich., to be appointed by its mayor; one from each of the following States, to be appointed by the respective governors: Illinois, Wisconsin, Indiana, and Michigan; and one from Indiana, representing the cities of Hammond, Whiting, and East Chicago, to be appointed by the mayors of those cities jointly.

It was recommended that this commission study and report as to the amount of pollution being emptied into Lake Michigan yearly; the direction of lake currents; the present pollution of the lake water; the future of the lake water as regards pollution; the distance to which pollution can and does travel in Lake Michigan; the purifying power of Lake Michigan water and associating influences; the study of the polluted streams emptying into Lake Michigan; the sewage disposal plans of cities, villages, and homes situated in the Lake Michigan basin; the amount of water for drinking purposes taken from the lake; the future use of Lake Michigan water for drinking purposes; the relations of the water intakes to the shore line, sewer outfalls, and other means of pollution.

In accordance with the foregoing plan, the city of Chicago undertook to bring about concerted action. In a letter dated March 30, 1908, Mr. Fred A. Busse, mayor of Chicago, requested the cooperation of the Public Health and Marine-Hospital Service in this movement. In accordance with this request, and with the approval of the Secretary of the Treasury, Surg. G. B. Young, stationed at the marine hospital, Chicago, Ill., was detailed to represent the service on the commission, and instructed to hold himself in readiness to meet with the other members of the commission for the inauguration of the work proposed.

The first meeting of the commission was held in Chicago April 18, 1908, at which was effected a permanent organization. Subcommittees were appointed to collect information as to the amount of sewage falling into the lake; the relation of outfalls to intakes; effect of local currents, and the typhoid death rates in towns about the lake. This will be followed by scientific investigations and the formulation of such remedial measures which seem advisable to prevent further pollution of that body of water.

The entire investigation is of vast interest to the Federal Government because of its bearing on interstate commerce. It should receive the active cooperation of the department, and there should be legislative action authorizing the service to undertake the investigation of similar interstate bodies of water.

INVESTIGATIONS OF TYPHOID FEVER IN THE DISTRICT OF COLUMBIA AND ELSEWHERE.

The board of officers appointed by the Surgeon-General to investigate the origin and prevalence of typhoid fever in the District of Columbia has continued its studies, the results of which, together with recommendations, are included in Hygienic Laboratory Bulletin No. 44. This bulletin also includes charts, maps, and tables

giving data concerning the geographical and seasonal prevalence of the disease; relation to water, milk, flies, and other agencies; epidemiological studies showing the incidence in relation to age, sex, occupation, sanitary condition of residences, etc.

Reference to this investigation will be found in the annual report for 1906, page 221, and in the annual report for 1907, page 29.

The board has now entered its third season of study upon this question. The work is being continued along the lines previously laid out, and it is hoped that the studies this year, especially, will throw much additional light upon the relation that the Potomac River water plays in the spread of typhoid fever in the District of Columbia. On account of the contradictory evidence no final conclusion upon this important subject has been reached, but the matter is being given special attention.

In addition to the previous line of study an intensive investigation was made of eight city blocks. The blocks were selected to represent the average population of Washington. A house-to-house canvass was made in this area and trained officers kept in close touch with every person in the district during the typhoid season in order to discover unrecognized cases of the disease. This work was inspired by Koch's results in Trier, Germany. In that little city typhoid fever had gotten a strong hold. Only 8 cases of the disease were recognized clinically, but by the aid of modern laboratory methods Koch actually found that there were 72 cases of typhoid fever in the town. Many of the cases had trivial symptoms and some were not ailing at all. These apparently well people were scattering typhoid bacilli and were a menace to the public health. All the cases were isolated, the discharges disinfected, and this action soon put an end to typhoid fever in Trier.

The investigations of typhoid fever carried on in the District of Columbia during the past two years have emphasized the necessity of isolation of those afflicted with this disease and the prompt and efficient disinfection of their discharges for its prevention. Recognizing the importance of the disease from an economic and hygienic standpoint, the mayor of the city of Pittsburg appointed a commission to study the cause of typhoid fever in that city. The commission is composed of the following men: Dr. J. F. Edwards, chairman; Prof. W. T. Sedgwick, Dr. Samuel G. Dixon, Dr. John W. Boyce, Dr. Milton J. Rosenau.

The following assistants were appointed by the commission: Mr. Morris Knowles, consulting engineer; Dr. E. G. Matson, executive officer; Mr. Frank E. Wing, secretary and treasurer.

The work is being carried on under the patronage of the Russell Sage foundation, which has allotted \$10,000 for the purpose.

The representation of the Director of the Hygienic Laboratory upon this commission has brought the work into direct coordination with the investigation of the origin and prevalence of typhoid fever in the District of Columbia which has been carried on by the service for the past two years.

The work in Pittsburg has been prosecuted along similar lines and by similar methods to those used in Washington, so that the results will be comparable. Such studies supplement each other and greatly equalize the value and broaden the scope of the conclusions that may

be drawn from the data collected. It is especially desirable that similar studies should be made in other cities, particularly in Baltimore, where the conditions approximate those in Washington.

HOOK-WORM DISEASE.

In the annual report for 1907, page 14, reference is made to an investigation of hook-worm disease in conjunction with the Bureau of Labor as it relates to woman and child labor in the United States. The prevalence of this disease, especially in the cotton and knitting mills of the Southern and New England States, was made the subject of careful study both from an economic and public health standpoint. The investigations were conducted by the Chief of the Division of Zoology of the Hygienic Laboratory. The field trip lasted about five months, and involved a visit to about 130 cotton and knitting mills and a number of other establishments in the States of North Carolina, South Carolina, Georgia, Alabama, and Mississippi, as well as some of the New England States. The data obtained have brought out some very important conclusions which, though not altogether in harmony with the popular ideas on the subject of child labor in the South, must be seriously considered in connection with this subject and which also point conclusively to the fact that child labor in the Southern States involves a consideration of certain medical and public health conditions not found in the Northern States.

The full data obtained are contained in a manuscript report which is practically completed and which will be forwarded to the Department of Commerce and Labor before January 1, 1909. As mentioned in the last annual report this investigation was undertaken at the request of that department.

These studies showed that approximately 12.5 per cent (more exactly 12.67) of the cotton mill employees were found to come within the suspect class of hook-worm disease. The percentage varied in the two sexes and at different ages. For instance, the percentage of hands over 20 years of age who were classified as suspects was 8.4 per cent; between 16 and 20 years of age, 19.2 per cent; and under 16 years of age, 27.2 per cent were placed in the suspect class. Of females 16.1 per cent were suspects, while of males, 15.2 per cent came within this class. Of boys under 16 years of age 29.4 per cent and of girls under 16 years old 18.7 per cent were suspects. Of males 16 to 20 years of age 20.7 per cent and of females 16 to 20 years of age 18.1 per cent were suspects. Of males over 20 years old 5.8 per cent, and of females over 20 years old 13 per cent were suspects.

The foregoing statistics, reported by Doctor Stiles, the Chief of the Division of Zoology, are very significant in their bearing upon the health of these people. It is seen, for instance, that among the females of maternity age from 13 to 18 per cent are in a condition which prevents them from properly nourishing babes. Of the males of possible military age, 5.8 to 20.7 per cent are in a condition which would materially decrease their military efficiency. Among children of school age, generally speaking, 18.7 per cent of the females and 29.4 per cent of the males are suffering from an anæmia-producing disease which would materially inhibit their normal capacity for study. The figures (18.7 per cent) for females under 16 years of age are significant also in connection with the retardation of menstrual develop-

ment among these girls. Taking all of the statistics together, it is seen that approximately 12.5 per cent (more exactly, 12.6 per cent) are affected with a disease which materially inhibits their normal working powers, and hence inhibits the economic development of the community in which they live.

The condition in question has heretofore been quite generally assumed on the part of people who visited the mills to be due to breathing in the lint. That this assumption is not free from very serious error of interpretation is evident from the fact that the anæmia in question varies greatly in different mills despite the fact that practically all of these people, so far as they breathe in lint, are subject to breathing in the same kind of lint. For instance, Doctor Stiles states that in certain mills which supply their labor chiefly from clay lands the percentage of infection among the children ran very low—under 10 per cent, or even down to nothing—while in one mill running exclusively on sand-land labor 80 per cent of the children were clearly hook-worm cases. Plotting the mills according to the origin of the labor, he has shown that the mills running on clay-land and city-born labor show the lowest percentage of anæmia. The presence of mountain labor raises the percentage of anæmia, and the presence of sand labor raises the percentage still higher. This fact effectually disposes of the importance which has hitherto been attributed to the lint as a factor in causing this widespread and extreme anæmia. It is also important to note that the severest cases of anæmia were found among children who had been in the mills only a few weeks.

In looking for an explanation of the origin of this anæmia it is necessary to consider certain important factors found in the South. Taking 8 South Atlantic and Gulf States, it is seen that there are 833 negroes to every 1,000 whites in the population. All of these States have 33 per cent, or above, negro population. Both hook-worm disease and malaria are found in the negro, but the negro is relatively immune to the pathological effects of both infections and therefore forms a tremendous reservoir for infection.

Doctor Stiles states that as a soil polluter the negro is to the white as 795 to 438; therefore he is nearly twice the spreader of hook-worm disease when compared with the white. He is also a greater relative spreader of malaria, because he screens less against mosquitoes. The conclusion is therefore evident that the white race in the South is living under a hygienic handicap, due to the presence of such a large proportion of negro population. The whites in better financial circumstances are able to protect themselves against this handicap, which falls more severely therefore upon the whites in poorer circumstances, namely, the rural tenant whites. This class of people, which does not exist in the North, is the direct product of competition for generations with negro labor plus the effects of these two great anæmia-producing diseases (hook-worm disease and malaria), which have been spread among them by the negro. It is almost exclusively from this class of people that the cotton mills recruit their labor, and when they bring from the soil-polluted farms into the mills families of rural tenant whites they naturally bring with these families the diseases already existing in them. The anæmia of the cotton mill, it must be concluded, is therefore much more the product of soil pollution on the tenant farms than it is the product of working in the mills, and as a

matter of fact these anæmic children improve in condition after coming to the mills, for the simple reason that in the mill villages they are brought to live under improved sanitary conditions. The child labor of the mills is found chiefly in the spinning room, and the product of the other rooms in the mills is dependent upon the product of the spinning room. If, now, any sudden change is made in child labor in the South, this will necessarily result in cutting down the labor of the mills, and for many of the families in question the only thing which will remain open to them will be a return to the soil-polluted small farms. Considering the mill from this point of view, it is seen that the southern cotton mill is an important sanitary uplifting influence for these people, and this important point must be borne in mind and must be balanced against any detrimental physical effects which mill life may have upon them.

Since the foregoing conditions do not exist in the North, it is evident that the question of child labor in the South contains elements which are not involved in the same question in the North. The complete report and the statistics quoted above emphasize the importance of hook-worm disease from the public health standpoint, and show that it is very prevalent throughout a certain section of our country, where it causes many deaths and a serious amount of invalidism.

The relation of soil pollution to this disease has been clearly demonstrated, and the means necessary for its prevention and cure are well known. The necessity is apparent of undertaking measures for the eradication of hook-worm disease, and to this end a campaign of education is essential. Communications have been received requesting the cooperation of the service in the improvement of the public health in this direction. In a letter dated February 11, 1908, the secretary of the state board of health of North Carolina requested the detail of an officer to cooperate and assist his board in efforts to eradicate the disease from the State. It was recognized that assistance of this character on the part of the National Government should be given upon request of state health authorities, and that such cooperation would be of mutual advantage to the national and state public health agencies.

Upon looking into the matter, however, it was found impossible to make the detail requested, as there is no provision for incurring expenses incident to such field investigations and cooperation with state and local health authorities.

The same question has arisen before in field investigations, and the prevention of other diseases which affect the health and prosperity of the country at large, and steps were taken with a view to having Congress provide for investigations and cooperation of this character.

There is no more fertile field in preventive medicine at the present time than the suppression of hook-worm disease, and it is of importance to the people of a large area of this country that the Public Health Service should take part in this work. Should the bill introduced in Congress to further protect the public health permit of the carrying on of this work and provide means for the diffusion of information relative to its prevention and suppression, steps would be taken to inaugurate further studies, and particularly a campaign of education in cooperation with state health authorities.

INVESTIGATIONS OF RABIES.

The prevalence of rabies in the United States has recently attracted increasing attention both because of the high mortality of the disease and its economic importance. Reports of scientific investigations conducted by an officer of the service stationed at Mobile, Ala., show that the disease has prevailed in that city. It is altogether probable that the disease is more prevalent, not alone in the South, but in other sections of the country than has previously been shown.

In January, 1908, experimental work on rabies was resumed at the Hygienic Laboratory, after having been discontinued for some time. This resumption was deemed necessary because of the recent work of a number of European investigators, which has promised to have practical value in the prevention of rabies and with which it is of importance that the laboratory should keep in touch. Notable examples are the serum and virus treatments advocated by Marie and others, which, according to the claims of the originators, may be useful adjuncts to or even at some time supplant the classical Pasteur method. Since the service may be called upon to officially pass upon these methods of treatment, should they assume commercial importance, it is apparent that their merits should be investigated as soon as possible.

There are many unsolved problems concerning the cause of rabies and the method by which immunity to the disease is conferred. Research work along these lines will have for its object improving the treatment so as to confer a higher degree of immunity more quickly than is possible with present methods.

The question as to whether or not there is a toxin in this disease, the nature of the virus, and its transference to the central nervous system are questions whose solution has practical application. The relation to the broad subject of anaphylaxis and the investigations into Ferran's method of prophylaxis, and many other subjects connected with the Pasteur method of treatment should be diligently prosecuted.

At the meeting of the national legislative council of the American Medical Association held in Chicago, December 10-13, 1907, a resolution was adopted recommending that the United States Public Health and Marine-Hospital Service make investigations of rabies as it affects man with the view to its prevention and cure. It was recognized that a thorough scientific investigation of the disease would be productive of much good, and should be immediately undertaken. It was believed that these investigations should include as accurate statistics as possible regarding the prevalence of the disease in man, the character of the infection, and measures for its prevention and cure. Fortunately, sufficient knowledge is now at hand to institute prophylactic treatment of those bitten by rabid animals.

Rabies is known to exist in the District of Columbia, and it was believed that scientific studies should go hand in hand with practical measures for its prevention among those exposed. This prophylactic treatment consists of the use of a "fixed virus," which must be prepared from day to day in a specially equipped laboratory. Great care must be exercised in preparing the same, and it should be administered only by those competent to do so. These conditions could be

met in the Hygienic Laboratory, and, in fact, the supervision of such a product properly comes within the provisions of the law of July 1, 1902, regulating the manufacture, barter, and sale of viruses, serums, and toxins.

It was, therefore, deemed advisable to prepare this product in the Hygienic Laboratory in connection with other studies of the disease, to the end that it might be available for persons exposed to the disease and in the interest of the public health. The matter was referred to the Director of the Hygienic Laboratory, and Passed Assistant Surgeon Stimson was placed in charge of the work of preparing the virus and making studies of the disease.

In a report dated June 11, 1908, the Assistant Director of the Hygienic Laboratory reported that there was an unusual prevalence of rabies in the District of Columbia at that time, and that between that date and April 29, 1908, there had been over 25 persons bitten by rabid dogs in the District. He recommended that the virus being prepared in connection with the experimental work carried on by Passed Asst. Surg. A. M. Stimson be made available for use in preventing the disease among such persons. It was recognized that such a measure would be of great public benefit, inasmuch as many of those bitten by rabid animals can not afford the expense of going away to take the treatment, and there is no place in the District of Columbia other than the laboratory where the virus is prepared.

With the approval of the Secretary of the Treasury, authority was granted the Director of the Hygienic Laboratory to administer the virus to such persons as might present themselves at the laboratory for that purpose.

The director reports that the first patient applied on April 29, 1908, and since that time 32 persons have begun treatment up to July 1, and 15 have completed treatment. Six discontinued treatment without completing it.

In a letter dated June 23, 1908, the Isthmian Canal Commission reported that there were 8 cases of rabies then under treatment in the Canal Zone, and it was requested that the bureau furnish the specific treatment for any cases that might arise or develop in the future. It was believed that the preparation in question could be furnished in glycerine with proper directions for the preparation of the emulsion and its use. With the approval of the Secretary of the Treasury, authority was therefore granted the Director of the Hygienic Laboratory to furnish from time to time the virus made in the laboratory for the prevention of rabies among those bitten by rabid animals in the Canal Zone.

Upon request of the secretary of the state board of health of North Carolina, the Director of the Hygienic Laboratory has been authorized to furnish the state board virus to be used in the treatment of persons bitten by rabid animals.

It is expected that, in addition to the investigations now made in the Hygienic Laboratory, a special investigation will be made with a view to determining the prevalence of the disease in the United States. It is known that the muzzling of all dogs has eradicated the disease in certain European countries. Information regarding the prevalence of the disease is therefore of great importance, with the view to instituting this wise preventive measure in certain areas of the United States. In the meantime, cases will continue to develop

among humans, and investigations of the same should be continued with the view to evolving a more systematic and effective method of treatment. This work will be carried on in the Hygienic Laboratory, and the virus, or other remedy made therein, should be made available to state and municipal health officers upon request, to be used in their efforts to protect the public health.

NATIONAL LEPROSY INVESTIGATION STATION, MOLOKAI, HAWAII.

In the annual report for 1907, page 57, the statement appears that satisfactory bids for the construction of the leprosy investigation station could not be obtained and that steps had been taken for the erection of the buildings under the superintendence of an agent of the department.

On September 22, 1907, Mr. F. W. Pease, inspector of repairs, of the Public Health and Marine-Hospital Service, was sent to Honolulu with instructions to prepare the necessary drawings and purchase building materials and other supplies, contract for labor and transportation, and superintend erection of the buildings.

CONSTRUCTION OF BUILDINGS.

This work has been carried on with energy since that time, and in a report from Mr. Pease dated August 21, 1908, it was stated that the director's and pharmacist's quarters were ready for laying the finished flooring, hanging doors and window sashes, installing plumbing, and painting. The storage building is completed and being used for storage of hospital supplies. The power house and cold-storage buildings were nearing completion, as was also the attendants' building. Carpenter work on the administrative and laboratory buildings was well under way, and the foundations for the remaining buildings were being laid. The sewerage system for the residence compound had been completed. The sewer pipe for attendants' building, laboratory, storage building, and cold-storage building had been laid. Wrought-iron pipes and wrought-iron water supply pipes had been provided for, connecting with the main water supply of the territorial leper settlement. The construction work will be carried on as rapidly as possible, and measures will be taken to install an ice machine and other necessary equipment of the buildings. It is expected that the station will be completed and ready for occupancy in January, 1909.

OPERATIONS OF THE LEPROSY INVESTIGATION STATION.

The selection of apparatus and furniture for the station has been completed. As many of the materials as possible were purchased in Honolulu, the remainder being shipped from New York and San Francisco. Upon the arrival of the laboratory apparatus, it was installed in a temporary building in Honolulu and used in connection with the preliminary investigations made by the director.

Previous to January 1, 1908, some cultural work had been done and a report prepared on the present status of the leprosy problem in Hawaii. Since January 1 the whole time of the director has been devoted to laboratory work along three general lines, namely, the treatment of leprosy, the cultivation of the leprosy bacillus, and the

diagnosis of leprosy. Since November, 1907, five cases of leprosy have been subjected to the Nastin treatment at the Kalihi receiving station under the joint care of the director and a physician of the board of health of the Territory of Hawaii. Other studies have also been carried on by Doctor Brinckerhoff, and he has submitted reports bearing on, first, the reaction of lepers to Moro's percutaneous test; second, a note upon the probability of the mosquito acting in the transmission of leprosy.

The investigations made thus far have demonstrated that the Kalihi receiving station affords excellent opportunity for the study of incipient cases, that such studies on the island of Oahu are absolutely essential to the success of the general investigation, and that, therefore, these investigations should be maintained on the island of Oahu for this purpose.

In a letter dated June 19, 1908, from Hon. James R. Garfield, Secretary of the Interior, who was at that time in Honolulu, attention is invited to these facts, and the department is urged to arrange for separate studies in Honolulu and to this end provide for the use of a portion of the appropriation made for the investigation of leprosy in Hawaii. By direction of the Secretary of the Treasury, this letter was referred to the director of the leprosy investigation station for an expression of his views and recommendations in relation thereto. In a letter from the director dated July 27, 1908, it was made apparent that the outcome of the general investigation depended upon studies of incipient cases and that these studies would have to be made in Honolulu. He also recommended that a portion of the appropriation be made available for this purpose. The entire correspondence was referred to the Comptroller of the Treasury for a decision as to whether the funds available and those to be appropriated could be used in this manner. After reviewing the subject the Comptroller rendered the opinion that the appropriations made by the act cited above are applicable to permit the study of incipient cases of leprosy on the island of Oahu, but not to establish a branch hospital or equip or support the same. It is therefore expected that in future a number of incipient cases will be studied and laboratory investigations made in addition to the work to be inaugurated on the island of Molokai.

INVESTIGATION OF A CASE OF LEPROSY.

In a letter dated January 21, 1908, Dr. Paulus A. Irving, secretary state board of health of Virginia, stated that there was discovered in Sussex County a patient suspected of having leprosy. He requested that an officer be detailed to aid in making the diagnosis, and, if it was found to be a case of leprosy, to advise as to the disposition of the same.

In accordance with this request, Passed Asst. Surg. G. W. McCoy was detailed to visit Sussex County, Va., stopping en route at Richmond to confer with Doctor Irving and obtain data as to the history and probable origin of the patient. As a result of this investigation, Doctor McCoy rendered a report, which states as follows:

"On January 31 I visited the case in company with Doctor Crawford, the county health officer of Sussex County. The case in question is that of a woman, Lena Leake, aged 45 years born near Libau,

Russia. The woman came to this country about nineteen years ago, living in Philadelphia until four years ago, when she moved to Virginia. She has 7 children living, the youngest being 3 months old. The 5 younger children were seen and examined; all are in good health.

"The woman says she first noticed an eruption of ring-like formation on her legs seventeen years ago, since which time new spots have appeared and the lesions have gradually spread until now they are found generally distributed over the body except on the scalp and front of chest and abdomen.

"The areas are anæsthetic and without sense of temperature; sense of touch is generally preserved. The areas vary in size from that of a split pea to some as large as the palm of the hand. There is a suggestion of beginning nodular lesions on the forehead. There is no atrophy of the muscles. There is a large ulcer on the sole of the right foot. The woman's general health is good.

"The case is, in my opinion, undoubtedly one of leprosy of the anæsthetic variety."

It was impracticable for the bureau to advise as to the disposition of the case, as there is no provision in law for the care of those afflicted with this disease. The discovery of this case and the lack of adequate facilities for her care again emphasizes the necessity of a national leper home.

PELLAGRA IN THE UNITED STATES.

In April, 1908, Passed Asst. Surg. C. H. Lavinder, stationed at Wilmington, N. C., stated that several cases of pellagra had recently been observed in that city, and that a patient suffering with organic disease of the heart had been admitted to the marine hospital at that port. Shortly after admission this patient developed symptoms of pellagra. This disease had previously been reported in other places, notably in Georgia and Alabama.

These reports indicate that the disease is more prevalent than has been supposed, and that it may in future assume importance from public health and economic standpoints.

Pellagra has prevailed in Italy and other countries in Europe for more than a century, and has been and still is a veritable scourge in certain localities. Its presence in Europe appears to have followed close upon the introduction of maize culture from America, and it is the accepted opinion of most students of the disease that pellagra is an intoxication due to using as food Indian corn which, under the influence of unidentified parasitic growths (fungi), has undergone certain changes with the production of one or more toxic substances of a chemical nature. When it is remembered that the cultivation of corn is one of the most important industries and the extent to which it is used as a food in the United States, knowledge concerning pellagra becomes of importance to the American physician, and more especially to the practitioner in the Southern States.

The disease as thus far identified in this country therefore deserves careful study, and Passed Assistant Surgeon Lavinder was requested to report upon the cases observed by him and present the same in a précis upon the subject. In this report the disease is described

as it prevails in the Old World, and reference is made to the few cases thus far observed in America. It is shown that there is some variation of the symptoms of these cases as compared with the descriptions of the disease that prevails abroad, and some thought has been expressed as to the identity of the former; yet there is a very general opinion that the cases in question were in all probability true pellagra.

The most notable differences between the cases reported in the South as compared with the descriptions of pellagra in other countries is the great preponderance of acute types and the high mortality. Whether this disease in the Southern States be true pellagra or not it has so far proven itself a factor to be reckoned with and it should receive most careful study, and the précis in question has been prepared for publication with the view to stimulating more accurate observations of cases which may develop in future.

In view of the almost universal growth and use of corn as a food in the United States, this disease should receive unremitting study.

MILK AND ITS RELATION TO DISEASE.

In the annual report of the service for 1907, page 35, reference is made to studies of milk carried on by direction of the President. This subject has attracted great attention, and its importance in connection with the public health is now beginning to be realized by people generally.

The results of the studies in question were compiled and published in Hygienic Laboratory Bulletin 41, for distribution among health officers and those interested in dairying and dairy hygiene. Many important scientific facts were established during this investigation. The influence of milk as a carrier of the infections of typhoid fever, scarlet fever, and diphtheria was emphasized, more than 500 epidemics traced to this source having been tabulated and included in the published report. In addition, the relationship of milk to tuberculosis, Malta fever, milk sickness, and intestinal diseases, and the influence of infected milk on morbidity, especially among children, was clearly stated.

There were given the diseases of the cow injuriously affecting milk and the sanitary requirements at dairies necessary for the production of clean milk. Approved standards for the examination and classification of milk were included in the bulletin as well as the measures necessary to be enforced for the protection of the public health.

With the view of determining the influence of "certified milk" on the health of communities where it is sold, as well as the extent of the movement, an officer was detailed to visit certain of these commissions and inspect the dairies operated under their patronage. The information obtained was compiled and included in Bulletin 41 under the caption "Certified milk and infants' milk depots," with the view to stimulating the interest of health officials and others as to the importance of pure milk for the use of invalids and infants, and to set forth the essentials necessary for its production.

The Director of the Hygienic Laboratory in his report states that a great deal of time was devoted to the investigation of milk in its relation to the public health. In fact, practically the entire resources

of the laboratory were concentrated upon an intensive study of this question during the first half of the fiscal year. These studies have shown how frequently filth and infection are contained in milk and what a prolific source of sickness and disease this apparently harmless fluid may be. Among the studies were those upon the so-called germicidal properties of milk, the frequency of tubercle bacilli in market milk, and the number of bacteria in market milk of the city of Washington.

The subject of pasteurization was especially considered, and careful studies were made by the director of the laboratory to determine its advantages and disadvantages. In addition, many chemical analyses of milk were made under the direction of the Chief of the Division of Chemistry of the Laboratory. During the year considerable time was spent in the chemical examination of the Washington milk supply in its relation to the public health. These examinations included the analysis of 452 samples of milk collected by the health officer of the District of Columbia during the months of July, August, and September, 1907, and careful examination of the samples for the commoner milk preservatives. Weekly reports of the results of these analyses were submitted by the laboratory to the health officer of the District of Columbia during the progress of the examination.

The results of the laboratory studies were included in Bulletin 41, referred to above. In addition, the thermal death points of pathogenic bacteria in milk were determined, and the results published in Hygienic Laboratory Bulletin No. 42, entitled "The thermal death points of pathogenic micro-organisms in milk."

The Director of the Laboratory reports that further work upon the bacteriology and chemistry of milk is now in progress. The best method of determining the presence of tubercle bacilli in milk is being worked out. The distribution of bacteria in the milk and cream, and other studies are being made. As time and facilities permit, these studies will be compiled and published in the interest of the public health, and they should be of value for reference in the sanitary supervision of milk supplies.

WATER EXAMINATIONS.

The influence of water in the propagation of infectious diseases has been the subject of consideration during the fiscal year. Through correspondence received in the bureau and otherwise, it was understood that in certain cities the water and ice supplies taken aboard interstate passenger trains and vessels were of questionable character. With the view to determining the extent of this practice, requests were made of officers of the service located in nine of the large railway centers in the United States to make observations with respect to the source of such supplies taken aboard trains and vessels at their respective ports, the method of handling the same, and the character of the water as determined by bacteriological and chemical examinations.

In response to this request, reports were received, and in general they show that the water and ice provided for use on board interstate trains and vessels are taken from the general water supply of these railway centers. A number of these water supplies are acknowledged to be more or less polluted, and in one city the unwholesome-

ness of the general supply has led the authorities of one railway system to furnish on its coaches, Pullman cars, and dining cars only distilled water and manufactured ice of known purity.

In some instances samples of water were forwarded to the hygienic laboratory for examination. These reports indicated that the water and ice supplied aboard interstate trains and vessels are a source of danger to the public health, and should be the subject of surveillance to prevent the spread of contagious and infectious diseases from one State or Territory to another.

During the investigation of typhoid fever a large number of samples of water have also been examined. The director of the laboratory reports that from June 1, 1907, to June 1, 1908, 604 samples of city water were examined. The method of carrying out the examination for the latter being that adopted as standard by the laboratory section of the American public health association. He also reports the examination of 141 samples of potable water taken from wells, springs, etc., in 61 of which colon bacilli were detected. In addition, 34 samples of water have been analyzed in the Division of Chemistry of the Hygienic Laboratory.

THE IDENTIFICATION OF FLEAS.

In the annual report for 1907, page 58, reference is made to the relation of fleas to the transmission of plague, and the desirability of determining whether the common rat flea, *Pulex pallidus*, is found in the United States and its possessions. Through the Division of Scientific Research and Sanitation this question has been the subject of investigation during the past year, and the results of identification of these insects collected in San Francisco were reported by Passed Assistant Surgeon Carroll Fox, and published in the Public Health Reports, September 25, 1908.

This work was carried on in connection with plague suppressive measures in San Francisco, and a total of 7,022 fleas were examined to July 31, 1908.

The figures given by Doctor Fox show that the *Ceratophyllus fasciatus* is the common rat flea in the vicinity of San Francisco, and that the *Pulex pallidus* follows not a very close second, the proportion being about 3 to 1. It is also shown that of 1,271 fleas taken from man not one was a *Pulex pallidus*, and only four were *Ceratophyllus fasciatus*. Two thousand five hundred and forty-eight of the above number were identified in the Division of Zoology of the Hygienic Laboratory, and fully one-third of this latter number were found to be *Pulex pallidus*.

The total number of fleas identified in the Hygienic Laboratory, their origin, and the different species, is given in the following table prepared by Passed Asst. Surg. Joseph Goldberger:

Belize, British Honduras:

<i>Ctenocephalus canis</i>	3
<i>Pulex pallidus</i>	12
<i>Pulex irritans</i>	12
Total	27

Ensenada, Mexico, <i>Pulex irritans</i>	1
Evansville, Ind., <i>Ceratophyllus fasciatus</i>	3
Habana, Cuba, <i>Pulex pallidus</i>	4

Los Angeles, Cal.:	
<i>Ctenocephalus canis</i>	3
<i>Ceratophyllus fasciatus</i>	2
<i>Pulex pallidus</i>	42
Total.....	47
Memphis, Tenn.:	
<i>Ceratophyllus fasciatus</i>	1
<i>Pulex pallidus</i>	23
Total.....	24
San Diego, Cal.:	
<i>Pulex pallidus</i>	2
<i>Pulex irritans</i>	2
Total.....	4
San Francisco, Cal.:	
<i>Ceratophyllus fasciatus</i>	1, 657
<i>Pulex irritans</i>	180
<i>Ctenocephalus canis</i>	21
<i>Pulex pallidus</i>	586
<i>Ctenopsylla musculi</i>	104
Total.....	2, 548
San Pedro, Cal., <i>Pulex pallidus</i>	
	9
Seattle, Wash.:	
<i>Ceratophyllus fasciatus</i>	144
<i>Pulex pallidus</i>	164
Total.....	308
Walla Walla, Wash., <i>Ceratophyllus fasciatus</i>	
	11
Washington, D. C., <i>Ceratophyllus fasciatus</i>	5
Grand total.....	2, 981

It will be observed that specimens were received from 15 localities, and that 5 species of fleas are reported. While no conclusions can be drawn as to the relative frequency of the different species, as the number of specimens sent from most of the localities were too few, they demonstrate that the *Pulex pallidus* is commonly found, and that it has a wide distribution.

It is expected that these investigations will be continued, and that efforts will be made to secure for identification specimens of fleas which infest ground squirrels of California and other small animals of like character.

INVESTIGATIONS OF DEVICES AND APPLIANCES ADVERTISED FOR THE TREATMENT OF DISEASES.

During the year requests have been received from different departments of the Government for opinions as to the therapeutic value of various devices and appliances advertised for the cure of diseases. These appliances and the correspondence relating thereto have been referred to the bureau sanitary board for investigation. The reports of this board indicate that the majority of these preparations and devices are without therapeutic value, may in some cases

result in positive injury, and are all advertised with fraudulent intent. It is understood that the only governmental restrictions against this nefarious business are contained in the acts of Congress approved September 19, 1890, and March 2, 1895, providing against the transmission through the mails of matter relating to lotteries, schemes to defraud, and schemes or devices for obtaining money or property by means of false or fraudulent pretenses.

It is believed that some effective measures should be taken to prevent fraud of this character, and that this service should have authority in law to determine the effect upon the public health of the so-called therapeutic appliances and treatments offered for sale in interstate traffic.

RELATIONS TO THE PHARMACOPŒIA.

The official standard for diphtheria antitoxin promulgated by the department in accordance with the law of July 1, 1902, to regulate the sale of viruses, serums, and toxins in interstate traffic was incorporated in the eighth decennial revision of the United States Pharmacopœia. This action had the effect of bringing the standard more prominently before the medical and pharmaceutical professions of the country, as the Pharmacopœia is the legal standard for therapeutic preparations not only of the National Government, but of many State governments. As a result the board of trustees of the United States Pharmacopœial Convention adopted the following resolution, a copy of which was received from the secretary of said board April 30, 1906:

Whereas the bulletins on the immunity unit for standardizing diphtheria antitoxin and on changes in the Pharmacopœia of the United States, published by the Public Health and Marine-Hospital Service, have proved to be of such advantage to the Pharmacopœia in bringing it more prominently before the medical and pharmaceutical professions of the country; and

Whereas the United States Pharmacopœia is the official standard of the Public Health and Marine-Hospital Service, the medical departments of the army and navy, and the United States customs service, and is the legal standard in more than half of the States of the Union; and

Whereas the United States Pharmacopœia is made the official standard in the pure food and drugs law now pending in Congress: be it

Resolved, That the board of trustees of the United States Pharmacopœial Convention would like to see the connection thus begun, between the United States Public Health and Marine-Hospital Service and the United States Pharmacopœia, continued, and would therefore ask the Surgeon-General of the Public Health and Marine-Hospital Service whether it would be practicable for that service to undertake the publication of a series of bulletins embodying a digest of comments on the United States Pharmacopœia.

Since the last revision of the Pharmacopœia much work of a highly technical character has been carried on in the Hygienic Laboratory in relation to the strength of serums and organo-therapeutic preparations. The official standard for measuring the strength of tetanus antitoxin, which was issued by the department October 25, 1907, should be included in the next decennial revision.

Studies are now being made of preparations of the thyroid gland and extracts of the suprarenal glands with the view to their standardization. Numerous preparations are also being examined to determine their therapeutic properties, and these studies include an extensive review of the current literature relating to pharmacology. It was recognized that this work should be made available for the

use of the pharmacopœial convention, and that the service might with advantage be associated in the revision of the Pharmacopœia. This could be done with advantage, as the Chief of the Division of Pharmacology of the Hygienic Laboratory is a member of the pharmacopœial convention, and the duties involved are closely related to the work of his division.

It was therefore deemed advisable to assemble pertinent facts arising in the work of the Hygienic Laboratory in relation to the Pharmacopœia, and in conformity with the request of the board of trustees of the pharmacopœial convention to publish them in the form of bulletins embodying a digest of comments on the Pharmacopœia. With the approval of the Secretary of the Treasury, this work has been undertaken, and there has been some enlargement of the Division of Pharmacology of the Hygienic Laboratory to carry on the work. This action will provide a convenient and effective means of giving publicity to many often isolated observations made in the laboratory. It will also insure the assistance of the Government in revising the Pharmacopœia, the revision of which has hitherto been made through voluntary and, for the most part, unpaid services.

RELATIONS TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The investigations of remedies in the interest of the public health and rendering the results thus secured available for use in the revision of the Pharmacopœia will be of value both to the medical and the pharmaceutical professions. The American Pharmaceutical Association, representing the pharmaceutical profession throughout the country, is especially interested in this work as, in addition to its relation to the Pharmacopœia, it also issues the National Formulary, which is now recognized as a legal standard by the National Government as well as by some state governments.

At the last meeting of the American Pharmaceutical Association, held in Hot Springs, Ark., September 7-12, 1908, the following resolution was adopted:

Resolved, That the council of the American Pharmaceutical Association request the Surgeon-General of the United States Public Health and Marine-Hospital Service to include in the Digest of Comments on the United States Pharmacopœia, now under way, a report of "Comments on the National Formulary," and that the general secretary be requested to send to Surgeon-General Wyman a copy of this resolution.

The preparation of a Digest of Comments on the United States Pharmacopœia is now under way, and a similar compilation relating to the National Formulary could also be compiled at the same time in accordance with the above resolution with but slight additional expense.

With the knowledge of the pharmacopœial convention and the approval of the Secretary of the Treasury, it is proposed, therefore, to extend the work already undertaken and publish a common volume to be known as "Digests of Comments on the Pharmacopœia and the National Formulary."

The Chief of the Division of Pharmacology of the Hygienic Laboratory was chairman of the scientific section of the American

Pharmaceutical Association, and is a member of the committee on the United States Pharmacopœia of this association, as well as of the American Medical Association. It is expected that the investigations under way and the cooperation had with these associations will result in the improvement of the standards for drugs and other medicinal agents.

INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE.

Cooperation with the international commission on zoological nomenclature has been continued through the Hygienic Laboratory, the Chief of the Division of Zoology serving as secretary of the commission. A number of cases have been submitted during the year for interpretation under the code.

INDEX CATALOGUE OF MEDICAL AND VETERINARY ZOOLOGY.

Through the Division of Zoology of the Hygienic Laboratory cooperation has been continued with the Zoological Division of the Bureau of Animal Industry in the preparation of an Index Catalogue of Medical and Veterinary Zoology. Of the authors' catalogue, the letters "A" to "M" have been published. The letters "N" and "O" are in press, and the letters "P," "Q," and part of "R" are ready for press. It is hoped that the library work on the authors' catalogue will be finished by January 1, 1909. Of the subjects catalogued, the *Trematoda* and Trematode diseases have now been published as Hygienic Laboratory Bulletin No. 37.

RELATIONS TO THE COUNCIL ON CHEMISTRY AND PHARMACY OF THE AMERICAN MEDICAL ASSOCIATION.

One of the most important reforms in the history of American medicine has been accomplished through the work of the council on chemistry and pharmacy of the American Medical Association. Many frauds have been uncovered, unwarranted claims in advertisements were given new light, manufacturers were compelled to state the true contents of the remedies they exploited, and many other similar reforms inaugurated looking to the general uplift of both the medical and pharmacal professions.

The Chief of the Division of Pharmacology of the Hygienic Laboratory is a member of this council, with the approval of the Secretary of the Treasury, and has taken an active part in its work. Upon the recommendation of the Surgeon-General, the Secretary of the Treasury has recognized the usefulness and public health character of this work by approving an enlargement of the Division of Pharmacology for the purpose of examining into the many drugs and combinations which are constantly being exploited.

It is desirable to investigate, in this connection, many of the secret and "patent" medicines for which such large sums of money are spent, and some of which have been shown to be injurious to health or entirely worthless.

The above lines of work involve considerable research, and it is desirable to extend this in other directions also. There are many important drugs for which standards of strength and purity have not

been worked out. Until this is done it is impossible to enforce laws having for their object the safeguarding of the public health. Work on some of these problems is in progress, but it could profitably be expanded. The medical profession and public are at present largely dependent upon private manufacturing concerns for the discovery of new drugs. Drugs discovered in this way are often sold at prices almost beyond the reach of the poor. Moreover, many fraudulent practices have arisen in this connection, as has been repeatedly pointed out by the Council on Pharmacology and Chemistry of the American Medical Association.

HYGIENIC LABORATORY.

During the fiscal year covered by this report the activities of the Hygienic Laboratory have increased in scope. Established for the investigation of infectious and contagious diseases and matters pertaining to the public health, it fulfills an important function, and is intimately bound up with the operations of the Bureau Division of Scientific Research. In addition to its relation to public health questions previously referred to, many matters of a routine nature, as well as research work bearing on sanitary problems, have been conducted. These subjects, as reported by the director, include the following: The sanitary aspects of milk, water pollution, soil pollution, hookworm disease, typhoid fever, rabies, tuberculosis, tetanus, diphtheria and other communicable diseases; immunity, hypersusceptibility, toxins, antitoxins, and germicides; pharmacological research relating especially to the glandular organs of the body, new remedies, and standards for organo-therapeutic products; zoological studies as they relate to the parasites of man, and chemical research relating to milk, water, ferments, and ferment action.

The following observations on the Hygienic Laboratory and its operations during the fiscal year are taken from the report of the director:

BUILDINGS AND GROUNDS.

The addition to the Hygienic Laboratory, for which Congress appropriated \$75,000, is now in course of construction. Plans were prepared by the Supervising Architect and the work is done under the direction of that office. The completed building will be 230 feet long, and it is expected that it will be completed in January, 1909. This addition will somewhat relieve the congested and crowded condition of the present small structure. The activities of the laboratory, however, have grown so fast that they are believed to have already outgrown the addition.

There is, of course, a direct relation between the amount of routine work that can be done in a laboratory of this character and the available space and equipment at hand. The improvements now under way will add greatly to the usefulness of the laboratory, and the building and grounds will look more attractive.

A further addition is needed, in the form of a wing extending back, to provide necessary space, both for the experimental and routine work and to afford room for the classes of student officers, as well as the lectures and demonstrations which are given to the students of the Naval Medical School and to the Army Medical

School, for rabies work, for the lighting and power plant, heating and ventilating apparatus, and finally, to give proper and comfortable shelter to the animals under experimentation. An item has therefore been included in the estimates to Congress for an appropriation of \$175,000 for this purpose.

PERSONNEL.

Four service officers were assigned to the laboratory to take the course in pathology and bacteriology, viz. Passed Asst. Surgs. L. L. Lumsden and J. W. Ames, and Asst. Surgs. W. W. Miller and C. W. Chapin. The director reports that in addition to taking the course Passed Assistant Surgeon Lumsden continued his duties as a member of the typhoid fever board, and Assistant Surgeon Miller assisted in the general work of the Division of Pathology and Bacteriology, giving particular attention to milk and water examinations, Widal tests, and the investigation of a new parasite pathogenic for rats, the result of which has been prepared for publication as Bulletin 46 of the laboratory series. Passed Asst. Surgs. W. W. King and George W. McCoy spent a part of the year in the laboratory, the detail of the former ending August 16, 1907, that of the latter March 13, 1908. Passed Asst. Surg. Joseph Goldberger was continued in the division of zoology and Asst. Surg. Norman Roberts in the division of chemistry. Asst. Surg. A. M. Stimson was continued in the division of pathology and bacteriology, where his principal work of the year was devoted to rabies.

In his report, the Director of the Hygienic Laboratory makes mention of the zeal, industry, and devotion of both officers and men to their duty. The cooperation between the different divisions and between the officers in the same division has added to the quantity and quality of the results obtained, and is an index of the esprit as well as the advantages of the present organization.

LABORATORY COURSE FOR STUDENT OFFICERS.

A special course lasting thirteen weeks has been inaugurated. The object of this course is to permit officers of the service to brush up on the recent advances in the laboratory side of the sanitary sciences, and especially to prepare them to make the laboratory diagnosis of plague, cholera, typhoid fever, glanders, tuberculosis, malaria, and other infectious diseases with which the service comes into most frequent contact. The course has been improved and made more practical, both through experience and as a result of advances in the subjects dealt with.

The Chief of the Division of Zoology gives a course of twenty hours upon animal parasites, consisting of practical demonstrations and lectures. The parasites infecting dogs, rats, cats, and other animals are searched for and studied. Many of these parasites closely resemble or are identical with those found in man. This method of teaching is therefore eminently practical and appreciated by those who have its benefits.

The Chief of the Division of Chemistry devotes one day to the sanitary analysis of water from the chemical standpoint, another day to the chemical analysis of milk, and a third day to the chemical

analysis of stomach contents. These subjects have been given especial attention in the division of chemistry during the past few years, and the methods improved and the subjects advanced as a result of original research. The methods are shown by practical demonstrations and the principles involved explained.

The Chief of the Division of Pharmacology reviews the history, purposes, and aims of the Pharmacopœia and the National Formulary, explains the relations of these standards to the practice of medicine, etc.

The modified course of three months covers the following:

1. *Preparation of media*.—Bouillon, gelatin, agar, potato, blood serum, milk, four days.

2. *Studies for microscopical practice*.—Diatoms, algæ, starch, vegetable cells, fibers, hair, milk, air bubbles, etc., two days.

3. *Saprophytes*.—*B. subtilis*, *B. vulgaris*, *B. megaterium*, *B. prodigiosus*, *pseudomonas*, *fluorescens*, *pyocyaneus*; *M. agilis*, *sarcina lutea*, *microspora aqualis*, yeast, molds, etc., seven days.

4. *Histological and pathological technique*.—Paraffin and celloidin methods, staining sections, frozen sections, five days.

5. *Anthrax*.—History, distribution, morphology, staining, cultural characteristics, spores, pathogenesis, vaccination, viability, disinfection, four days.

6. *Colon-typhoid group*.—*B. typhosus*, *B. dysentericæ*, *B. enteritidis*, *para-typhoid A*, *para-typhoid B*, *B. typhi murium*, Danysz rat virus, *B. psitticosis*, *B. icteroides*, *B. acidi lactici*, *B. coli*; differentiation, cultural characteristics, agglutination, diagnosis, isolation from feces and blood, viability, Endo's medium, seven days.

7. *Diphtheria*.—History, morphology, staining, diagnosis, animal inoculations, toxines, antitoxin production, standardization, viability, disinfection, eight days.

8. *Pyogenic group*.—*Staphylococci*, *streptococci*, *M. gonorrhææ*; pus, pure culture, three days.

9. *Cholera group*.—*M. comma*, *M. metchnikovi*, *M. finkleri*, *V. denecke*, *M. migula*; Pfeiffer's phenomenon, isolation, agglutination, immunity, Haffkine's prophylactic, viability, disinfection, five days.

10. *Tubercle group*.—*B. tuberculosis*, Möller's grass bacillus, Rabbinovitsch's butter bacillus, Karlinsky's nasal secretion organism, Smegma bacillus, *B. lepræ*; tuberculins, staining, cultural methods, human and bovine tuberculosis; tubercle bacilli in milk, etc., four days.

11. *Glanders*.—*M. mallei*; cultivate, stain; mallein, Strauss method in male guinea pig, one day.

12. *Plague*.—*B. pestis*; morphology, cultural characters, animal inoculations, Kolle's method; pathology, viability; rat plague; *Pulex cheopis*, eight days.

13. *Anærobic technique*.—Tetanus; toxin and antitoxin, standardization, two days.

14. *Chemical analysis of water and milk*.—Lectures and demonstrations, ten hours.

15. *Animal parasites*.—Demonstrations, lectures, and practical laboratory work, twenty hours.

16. *Bacteriological examination of water and milk*.—Practical exercises, six days.

17. *Vaccine virus*.—Visit to the farm; propagation of virus, method of vaccination, use of glycerin; examination of vaccine virus, law of July 1, 1902, one day.

18. *Testing disinfectants*.—(1) gas, (2) liquid, three days.

19. *Blood and urine examinations*.—Twenty hours.

20. *Hydrophobia*.—Lectures and practical demonstrations, ten hours.

COOPERATION WITH THE ARMY AND THE NAVAL MEDICAL SCHOOLS.

The director delivered several lectures before the students of the Naval Medical School and the chief of the division of zoology gave a series of lectures at both the army and naval medical schools, similar to the lectures delivered in the past several years. These lectures were supplemented by demonstrations in the laboratory.

COOPERATION WITH THE LOCAL HEALTH OFFICER.

At the request of the health officer of the District of Columbia a large number of water samples from wells and springs in the District of Columbia have been examined in the laboratory. The results of the many hundreds of sanitary analyses made of the market milk of Washington were at once transmitted to the health officer, who notified the dairymen concerning the excessive bacterial content or non-compliance with the chemical standards. Numerous Widal tests and blood cultures for the diagnosis of typhoid fever were also made, and one examination of stains to determine whether or not there was human blood, for medico-legal purposes.

IMMUNITY.

The problems of immunity have been of perennial interest to the laboratory. Immunity as rendered by diphtheria and tetanus antitoxins has been investigated further with the result that there is a somewhat clearer understanding of these substances and their action. In addition to the antitoxic immunity as now understood, there is a large class of communicable diseases in which immunity depends upon an "immediate reaction" which has been studied in the laboratory under the general heading of anaphylaxis. Von Pirquet prefers the word "allergie" to distinguish this kind of immunity from the more passive or antitoxic immunity.

ANAPHYLAXIS.

This subject has excited much interest both in this country and abroad, and a large mass of experimental work has been added. The literature upon the subject is becoming voluminous. The phenomenon itself has not only been studied further in detail, but the mechanism of anaphylaxis has been given special attention. The impression is spreading that this phenomenon of hypersusceptibility has a close relation to protein metabolism. The final solution of anaphylaxis will therefore probably throw much light upon the fundamental questions of nutrition. The relations of anaphylaxis to the broad problems of pathology and immunity are appreciated, and attention

is given to them. The studies upon anaphylaxis which have been carried on in the division of pathology and bacteriology during the fiscal year have been made the subject of a special report.

THE CAUSE OF PUERPERAL ECLAMPSIA.

The research work carried on by the director and assistant director has led to results which seem for the first time to throw new light upon the mystery of the toxemias of pregnancy. The cause of this condition has never been explained. It seems that the poisons, whatever they may be, arise from the placenta and not from the fetus. It was found that guinea pigs may be sensitized by the extract of guinea pig placental cells. The same guinea pig may then be poisoned by a second introduction of placental extract after an interval of several weeks. It is a surprising fact that an animal may be sensitized and poisoned with her own organ extracts that, upon first injection, seem harmless.

It is known that the placental cells invade the maternal organism, and it may be assumed that the first introduction of such cells may sensitize the mother, and a subsequent injection may poison the sensitized organism, thus bringing on some of the conditions known in puerperal eclampsia. Further work along these lines, especially to determine whether the liver lesions may be reproduced, are now in hand.

THE SERUM DISEASE.

The untoward effects resulting from the introduction of horse serum into the human organism have been called the "serum disease" by Von Pirquet and Schick. This syndrome consists in an eruption, usually urticarial in type, fever, albuminuria, joint pains, and enlargement of the lymph glands. The symptoms, as a rule, appear about fourteen days after injection of the serum. Sometimes the symptoms occur with suddenness and violence; occasionally collapse, and in rare instances sudden death, follows the injection of horse serum. Studies made in the division of pathology and bacteriology upon guinea pigs seem to throw light upon these phenomena.

Further studies are being made along these lines and will be made the subject of future reports.

EXAMINATION OF PATHOLOGICAL SPECIMENS.

A number of specimens of organs, tumors, and other diseased processes were examined in the laboratory. More specimens of this character should be sent in to the laboratory from the various stations for two reasons: First, the laboratory is dependent upon outside sources for its pathological material, and, second, it is believed that the examination of specimens would be of much benefit in the treatment of the sick at the marine hospitals.

Twenty-five specimens were sectioned and diagnosis reported.

EXAMINATION OF BLOOD CULTURES FOR THE TYPHOID BACILLUS.

The director reports that specimens of blood, received from various sources, were examined in the laboratory for the presence of the typhoid bacillus. The technique employed was the bile-enrichment

method with subsequent plating out on appropriate media. This method seems to be a very satisfactory one and has given a high percentage of positive results. Sixty Widal tests were made of blood from supposed typhoid fever cases.

ANTISEPTICS AND DISINFECTANTS.

During the year a number of samples of disinfectants were examined and reports made thereon.

The work upon the antiseptic and germicidal action of sulphur dioxid, made by burning sulphur, was continued in the division of pathology and bacteriology. These studies were made in conjunction with the division of chemistry, and the director reports that after further experiments are completed the manuscript will be prepared for publication.

The work upon the antiseptic and germicidal value of solutions of formaldehyde was completed and published as laboratory bulletin No. 39.

A large number of samples of various proprietary disinfectants were examined in the laboratory. On account of stress of other duties this work was temporarily suspended, but it is hoped to resume it next year. The examination of these products is a matter of considerable public health importance, as many of them have large sale, and are used by physicians and nurses upon the advertised statements that they are effective, when in fact many of them are practically worthless.

GERMICIDES.

A number of germicidal agents were examined to determine their efficiency, and a special study was made of the action of formaldehyde in solution and also sulphur dioxid gas.

A large number of germicidal substances widely advertised in the professional and lay press have been examined. Some of them were found to have little virtue. A germicidal substance with little or no power is exceedingly dangerous, as it gives a false sense of security. When a disinfectant is necessary a well-known standard, such as carbolic acid (phenol), formalin, lime, or bichloride of mercury, is preferable as having a known and recognized efficiency. When used in proper strength under appropriate conditions one of these may be relied upon. It is therefore a mistake to substitute one of these standards, even if it has the objection of unpleasant odor, etc., for an advertised substance of perhaps unknown composition and doubtful efficiency.

A NEW PARASITE.

In March, 1908, an epidemic was observed in the stock of white rats kept for laboratory purposes. The animals died in four days to two weeks after the onset of the symptoms. The disease was studied by Assistant Surgeon Miller, who discovered a new animal parasite belonging to the *Hæmogregarina*, which he has called *Hepatozoon perniciosum*. This parasite somewhat resembles the *Leucocytozoon canis* found in dogs in India. The *Hepatozoon perniciosum* multiplies in the liver cells of the rat. It passes through a complicated life cycle which has been completely unraveled by Doctor Miller. The inter-

mediate host is a mite, *Lelaps echidninus*, which lives by sucking the blood of the rat. A large number of rats were experimentally infected by placing upon them mites which had fed upon infected rats. The infection occurred in fifteen to twenty-eight days or longer. A complete account of the life cycle and pathological effects of this parasite appears in Hygienic Laboratory Bulletin No. 46, which is now in press.

SPIROCHETE INTERROGANS.

Passed Asst. Surg. A. M. Stimson last year discovered a very interesting spirochete in the kidney from a yellow-fever case. It is desirable and important to obtain further yellow-fever material properly fixed in formalin in order to determine what relation this parasite may have to the disease. The bureau would therefore be pleased to have yellow-fever tissue, especially of the kidney, from typical cases sent to the Hygienic Laboratory for study.

DETERMINATION OF ZOOLOGICAL SPECIMENS.

The Division of Zoology has continued to make zoological determinations of animal parasites for physicians, boards of health, etc., and a large number of such determinations, including many fecal examinations as aid in diagnosis, have been made.

EXAMINATION OF DRUGS AND CHEMICALS.

Samples of the drugs and chemicals purchased by the medical purveyor for use at marine hospitals and quarantine stations during the year were examined in the laboratory. The work of examining these samples devolves upon the Divisions of Pharmacology and Chemistry. In the Division of Pharmacology about 150 analyses of drugs and chemicals were made, including the analysis and assay of 66 drugs received from the purveying depot, 35 analyses of commercial thyroid preparations, and the examination of a number of samples of drugs and therapeutic preparations received from various hospitals. In the Division of Chemistry there were analyzed four of the samples of drugs above mentioned. In addition, expert opinions were rendered by the Chief of the Division of Chemistry on the following subjects:

- (1) The efficiency of paraffined milk containers.
- (2) The effect of the acids of fruits on the digestion of carbohydrates.
- (3) The right of the Corn Products Refining Company of New York to the use of the label "Karo (Trade-Mark) Corn Syrup with Cane Flavor," under the food and drugs act of June 30, 1906.
- (4) Variations in the amount of carbon dioxide in the atmosphere under different meteorological conditions, and the possible significance or such variations in the causation of certain diseases.
- (5) Methods for the determination of carbon dioxide in atmospheric air.

In the Division of Pharmacology a card index of the cases of poisoning reported in the medical journals is being kept. This has frequently been of service in replying to inquiries as well as in research work.

PHARMACOLOGICAL RESEARCH.

Research has been carried out on a number of subjects in the Division of Pharmacology. An extensive study of the relation of iodine to the thyroid has been undertaken, the chief object being the suggestion of standards which would insure uniform and active preparations of this drug. In connection with this work it was necessary to make a careful detailed study of the methods for determining iodine in the thyroid. Many commercial thyroid preparations, including a number of "patent" medicines containing this drug, were examined. A large number of pathological thyroid glands were studied chemically and physiologically. The effects of various iodine compounds upon the thyroid were also investigated. Work upon cholin derivatives was continued and a large number of new compounds made; these have not been studied in detail physiologically, but some of them promise to be of considerable interest. An extensive study of the solubilities of the chemical compounds contained in the United States Pharmacopœia has been begun; the results with salicylic, benzoic, camphoric, and boric acids are ready for publication. The various methods for the determination of salicylates have been tested and what is believed to be a useful modification of them devised. Special attention has been given to the United States Pharmacopœial methods for the determination of the salicylates and the chief of the Division of Pharmacology reports that suggestions for an improved method will be made. A number of experiments were performed upon the toxicity of acetanilid and the supposed antidotal action of caffeine to this drug; this work was suggested by a case relating to a headache remedy which was tried in Washington under the pure food and drugs act. Recently work has been taken up on the standardization of suprarenal and digitalis preparations.

PHARMACOLOGICAL COMMUNICATIONS.

Some of the results of the work on the thyroid were published in the Journal of the American Medical Association, October, 1907; a short paper on the detection of thyroid secretion in the blood in a case of exophthalmic goitre appeared in the same journal for July, 1907. A paper on "A new standard for use in the colorimetric determination of iodine" appeared in the Journal of Biological Chemistry, October, 1907. The work embodied in these papers and many other results were incorporated in a Hygienic Laboratory bulletin, "On standards for thyroid preparations and on the relation of iodine to the physiological activity of the thyroid." Other publications during the year were "Comments on isopral and chloral" in the Journal of the American Medical Association, December, 1907; "The physical constants of the chemical compounds of the United States Pharmacopœia," Proceedings of the American Pharmaceutical Association, volume 55, and "The solubilities of boric, camphoric, benzoic, and salicylic acids in aqueous ethyl alcohol solutions" in the Proceedings of the American Electro-chemical Society, 1908. Communications based upon the work of the division were made to scientific associations as follows:

1. "Experimental alcoholism," British Association, Leicester, England, August, 1907.

2. "The relation of iodine to the thyroid," International Physiological Congress, Heidelberg, Germany, August, 1907.

3. "The physical constants of the chemical compounds of the United States Pharmacopœia," American Pharmaceutical Association, New York, September, 1907.

4. "Note on the colorimetric determination of iodine," Washington section of the American Chemical Society, October, 1907.

5. "The experimental basis of organo-therapeutics," Association of American Physicians, Washington, D. C., May, 1908.

6. "Commercial thyroid preparations," American Medical Association, Chicago, June, 1908.

7. "Methods for the determination of salicylates," American Chemical Society, New Haven, Conn., June, 1908.

CHEMICAL RESEARCH.

In the Division of Chemistry research has been carried on during the year in the following subjects:

(1) The peroxidase reaction of milk.

(2) The influence of various oxidizable substances on the peroxidase reaction.

(3) The use of aqueous solution of acid fuchsin as a permanent standard for nitrites in water analysis.

(4) The peroxidase reaction of urine in health and disease.

(5) The available alkali in the ash of human and cow's milk in relation to infant nutrition.

(6) The use of nitrous acid and nitrites in the determination of the mineral constituents of the urine.

In connection with the chemical investigation of the Washington milk supply, there were examined 477 samples of milk sold in the District of Columbia, including thorough tests for adulterants and milk preservatives. These results, together with a general treatise of the composition of milk, the chemical changes occurring therein, the municipal, state, and national standards governing the sale of milk, milk adulteration, and the use of milk preservatives were included in article 10 of Hygienic Laboratory Bulletin No. 41, entitled "Milk and its relation to the public health."

During the investigations of milk, studies were made of certain of its ferments, especially the peroxidase and the thermal death point thereof. This was done particularly with the view of throwing additional light on the nature and extent of the changes in the biological properties of milk brought about by pasteurization.

The whole subject of the peroxidase test for fresh milk, as distinguished from milk that has been sterilized by heat, has been investigated and certain improvements introduced which have greatly increased the sensitiveness of the peroxidase reaction. It has been found that while milks which have been heated to 70° C. for one hour, or 75° C. for twenty minutes, no longer give the peroxidase reaction, this reaction is not diminished, but if anything somewhat intensified by heating the milk to 60° for twenty minutes. It has been observed further that the peroxidase activity both of human and cow's milk varies considerably during the lactation period, being greater during the colostrous stage.

A number of substances have been found which greatly intensify the peroxidase reaction, thereby increasing the sensitiveness of this

biochemic test, and considerably extending its usefulness. In connection with the work of the Division of Chemistry on milk, certain questions bearing on the subject of infant nutrition by human and cow's milk received attention. In view of the excessive mortality among infants, due in considerable measure to malnutrition, especially among artificially fed infants, the whole subject of milk in its relation to infant feeding is one of the greatest possible importance and interest from the standpoint of the public health. It has been found that the ash of human milk, while much smaller in amount than that of cow's milk, contains fully as much available alkali as the ash of cow's milk, a point which is believed to be of considerable significance in the mineral metabolism of the suckling. Finally in connection with the general subject of mineral metabolism, a method has been devised for the more accurate determination of the mineral constituents of urine, especially of the alkali metals. It is proposed to utilize this method in the investigation of changes in the mineral metabolism in acidosis, and other diseased conditions.

The results of investigations carried out in the Division of Chemistry during the year were embodied in reports and communications and published in the form of bulletins or of special articles in scientific journals as follows:

(1) "The chemistry of milk," article 10, Hygienic Laboratory Bulletin No. 41 (Milk and its Relation to the Public Health, pp. 307-417).

(2) "The peroxidase reaction of milk" (Journal of Biological Chemistry, Volume IV, pp. 301-320).

(3) "On the available alkali in the ash of human and cow's milk in its relation to infant nutrition" (American Journal of Physiology, Volume XXII, pp. 284-308).

(4) "Peroxidase accelerators and their possible significance for biological oxidations" (American Chemical Journal, *in press*).

The following communication, intended for publication in the American Journal of Physiology, is in preparation:

On the Use of Nitrous Acid and Nitrites in the Determination of the Mineral Constituents of the Urine.

BULLETINS OF THE HYGIENIC LABORATORY.

During the fiscal year the following Hygienic Laboratory bulletins were published:

Bulletin No. 39.—The antiseptic and germicidal properties of solutions of formaldehyde, by John F. Anderson. This is an exhaustive study of the antiseptic and germicidal properties of solutions of formaldehyde; also, the germicidal properties of formaldehyde solutions as a means of disinfecting sputum, feces, urine, and bacterial toxines. It was found that diphtheria and tetanus toxines are readily destroyed by solutions of formaldehyde.

Bulletin No. 40.—This bulletin contains a description of a peculiar parasitic disease of the skin of man in Florida, caused by the presence of a larval tapeworm known as *Sparganum proliferum*. It contains a description of the original specimen of *Filaria restiformis* described by Leidy in 1880 as a parasite of man. This worm is shown to be not a *Filaria* but a member of the family Mermithidæ, and doubts are

cast upon its occurring in man. Two new Trematode parasites, namely, *Homalogaster philippinensis* from the Philippines, and *Agamodistomum nanus* from Africa are described. The results of a re-examination of *Taenia saginata abietina* from man in North America are also given.

Bulletin No. 41.—The following articles in this bulletin were prepared in the laboratory:

“The frequency of tubercle bacilli in the market milk of the city of Washington, D. C.,” by John F. Anderson. Samples of milk were examined from 102 dairies, 10.7 per cent of the dairies showing tubercle bacilli in the milk supplied to their customers. The results obtained emphasize the necessity for the enactment and rigorous enforcement of a law requiring that all cows supplying milk to the District be tuberculin tested.

“The relation of goat’s milk to the spread of Malta fever,” by John F. Anderson. In this paper Doctor Anderson shows that Malta fever is conveyed by means of the milk of goats infected with the specific organism of the disease.

“The chemistry of milk,” by Joseph H. Kastle and Norman Roberts. This paper treats of the chemistry of milk in relation to the public health. Of 452 samples of Washington market milk examined, 53.5 per cent contained 0.07 per cent or more dirt by volume of the milk; comparatively few samples were absolutely clean. The local milk supply is practically free from preservatives and artificial coloring matter.

“Milk supply of cities in relation to the epidemiology of typhoid fever,” by L. L. Lumsden. The prevention of the introduction of infection into milk is pointed out as the cardinal desideratum. The destruction of infection in milk is then taken up.

“Milk sickness,” by George W. McCoy. This peculiar disease is considered from a public health standpoint.

“The significance of leucocytes in milk,” by W. W. Miller. If a dairy milk shows an unusually high leucocyte count, a special examination of the herd for garget, etc., should be made.

“The number of bacteria in milk, and the value of bacterial counts,” by M. J. Rosenau. The average number of bacteria in Washington market milk for 1907 was 11,270,000 per cubic centimeter as compared with 22,134,000 per cubic centimeter for 1906. The numbers of bacteria contained in a milk are not so important as the kind and nature of the bacteria.

“Pasteurization,” by M. J. Rosenau. Theoretically, pasteurization should not be necessary; practically, we find it forced upon us. The heating of milk has certain disadvantages, but it effectually prevents much disease and death, especially in infants during the summer months.

“The germicidal property of milk,” by M. J. Rosenau and George W. McCoy. The germicidal action of milk is specific. Freezing and thawing for ten minutes does not affect this property. Heating milk about 80° C. destroys the germicidal property. The germicidal action varies in different animals and in milk from the same animal at different times. At most, the action is variable and feeble. It can not take the place of cleanliness and ice, but may be taken advantage of in good dairy methods.

"The relation of cow's milk to the zooparasitic diseases of man," by Ch. Wardell Stiles. The danger of contracting zooparasitic diseases through the milk supply is in general more theoretical than real, and can be prevented by the most elementary methods of cleanliness.

Bulletin No. 42.—"The thermal death points of pathogenic micro-organisms in milk," by M. J. Rosenau. Especial attention is given to the thermal death point of the tubercle bacillus. Nine series of tests with five cultures plainly show that in milk the tubercle bacillus loses its virulence and infective power when heated to 60° C. for twenty minutes. In other words, it may be considered dead. It should be remembered that the milk in these tests was very heavily infected with virulent cultures. Milk practically never contains such an enormous amount of infection under natural conditions. It is therefore justifiable to assume that if 60° C. for twenty minutes is sufficient to destroy the infectiousness of such milk when injected into the peritoneal cavity of a guinea pig, any ordinary market milk after such treatment would be safe for human use by the mouth so far as tubercle bacilli are concerned. Similar tests were made with the typhoid, diphtheria, and dysentery bacillus, the cholera vibrio, and the *Micrococcus melitensis*.

Bulletin No. 43.—"The standardization of tetanus antitoxin (an American unit established under authority of the act of July 1, 1902)," by M. J. Rosenau and John F. Anderson. This bulletin contains a description of the standard unit for tetanus antitoxin. It contains also a review of the literature upon tetanus toxin, the pathology of tetanus, preparation of the unit, technic in testing antitetanic serum, and a set of tables for the dilution of serums.

Bulletin No. 44.—Second report on the origin and prevalence of typhoid fever in the District of Columbia, by M. J. Rosenau, L. L. Lumsden, and Joseph H. Kastle. This bulletin contains the results of further studies upon typhoid fever in the District of Columbia. The conclusion is reached that typhoid fever will cease to exist as a problem in any community having clean water, uninfected milk, and in which typhoid fever is regarded as a dangerous contagious disease.

Bulletin No. 45.—Further studies upon anaphylaxis, by M. J. Rosenau and John F. Anderson. This bulletin contains a continuation of the studies by the director and assistant director upon anaphylaxis and its relation to immunity. An important point brought out is the relation of anaphylaxis to the toxemias of pregnancy.

Bulletin No. 46.—*Hepatozoon perniciosum*, by W. W. Miller. The *Hepatozoon perniciosum*, n. g., n. sp., is a hemogregarine found in white rats in Washington, D. C., and the cause of an epizootic observed among these animals. The protozoon is conveyed by a mite (*Lelaps echidninus* Berlese), which is the true intermediate host. Infection is transmitted to the rat when the mite is swallowed by the rat. The mites are ecto-parasites upon the rats, from which they receive infection by sucking the blood. Multiplication of the hemogregarine in the rat takes place in the liver. In the stomach of the mite the hemogregarines conjugate and form an ookinet, which penetrates the stomach wall and completes its development in the body tissues of the mite.

MISCELLANEOUS PUBLICATIONS.

In addition to the bulletins issued by the laboratory, the number and scope of which have already been set forth, a considerable number of shorter articles have been published with the approval of the bureau in various medical and scientific journals as follows:

"Pasteurization." Bur. Animal Industry Circular No. 114, August 20, 1907, p. 30. M. J. Rosenau.

"The causes of typhoid fever." Washington Medical Annals, vol. 7, March, 1908, p. 56. M. J. Rosenau.

"Federal supervision of biologic therapeutic products." American Journal of Public Hygiene, vol. 18, May, 1908, p. 126. M. J. Rosenau.

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"Note on the colorimetric determination of iodine." Read before the Washington section of the American Chemical Society, October, 1907, but not published. Atherton Seidell.

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These articles embody the results of scientific researches carried on in the several divisions and serve to direct attention through appropriate channels to certain phases of the scientific work done in the Hygienic Laboratory. As a general thing the articles are not of sufficient scope to warrant their publication as separate bulletins; they nevertheless contain many observations and data of general scientific interest and of value from the standpoint of public health. Such publications serve to popularize and awaken an interest in the work of the service among those interested in public health matters.

REPRESENTATION IN SCIENTIFIC SOCIETIES.

All four divisions of the laboratory were represented at various meetings of scientific societies that were held during the fiscal year. The following are the more important:

American Medical Association.

American Public Health Association.

American Association of Pathologists and Bacteriologists.

American Association for the Advancement of Science.

American Association of Medical Milk Commissions.

American Chemical Society.

American Pharmaceutical Association.

Society of Biological Chemists.

Society for Experimental Biology and Medicine.

Society of American Bacteriologists.

Association of American Physicians.

International Zoological Congress.

Association of State and National Dairy Departments.

Medical Society of Alabama.

Medical Society of the District of Columbia.

Medical Society of North Carolina.

Medical Society of Baltimore.

Medical Society of Albany, N. Y.

Milk Commission of New York City Associated Charities.

The journal club, maintained in connection with the Hygienic Laboratory, continued its biweekly meetings for the purpose of reviewing current literature and discussing the work of the laboratory.

THE ADVISORY BOARD OF THE HYGIENIC LABORATORY.

In accordance with section 5 of the act of Congress approved July 1, 1902, a meeting of the advisory board of the Hygienic Laboratory was held in Washington February 27, 1908, the following members of

the board being present: Surg. Gen. Walter Wyman, Dr. William H. Welch, Dr. Victor C. Vaughan, Dr. William T. Sedgwick, Dr. Frank Wesbrook, Maj. W. D. McCaw, U. S. Army; Surg. John F. Urie, U. S. Navy; Dr. A. D. Melvin, and Surg. M. J. Rosenau. In addition, the following were invited to sit with the board because of their relation to the investigation of the origin and prevalence of typhoid fever in the District of Columbia during the seasons 1906 and 1907: Asst. Surg. Gen. J. W. Kerr, Passed Asst. Surg. L. L. Lumsden, and Dr. J. H. Kastle.

The meeting was called to order by the Surgeon-General, who stated that its principal object was to review the findings of the board of officers regarding their investigations of the origin and prevalence of typhoid fever in the District of Columbia during the season 1907; also to receive advice with respect to the scientific work under way in the Hygienic Laboratory, especially with reference to the advisability of continuing the studies of typhoid fever.

The summary of the work of the typhoid fever board during 1907, together with conclusions and recommendations, were presented to the advisory board for its consideration.

The Surgeon-General requested the members of the advisory board to review the conclusions and recommendations of the typhoid-fever board, and invited suggestions.

During the discussion, Doctor Sedgwick favored the increase of laboratory facilities as an aid to physicians in diagnosing typhoid fever and in determining when persons who have had typhoid fever cease to be bacillus carriers.

The role of milk in spreading typhoid fever was adverted to, Doctor Welsh having called attention to the necessity of purity of this product.

Doctor Melvin outlined measures that had been taken with respect to the milk supply and explained the classification of market milk. He also stated that a great deal of the trouble in regard to dairy inspection had been its superficial character, and urged that closer inspections be made.

The advantages of pasteurization as a means of limiting the spread of infection was referred to by Doctor Rosenau.

Doctor Sedgwick referred to contagion as a factor in the origin of typhoid fever, and suggested that in making recommendations the contagious character of the disease should receive attention. He coincided with the views of the board that the disease should be treated as "contagious and dangerous to the community," which would include the isolation of patients, the disinfection of their discharges, bedding, etc.

Doctor Vaughan thought that it would be inadvisable to say that the Potomac water had absolutely nothing to do with the spread of typhoid fever in the District of Columbia, and suggested that the qualifying phrase "so far as could be ascertained" be used in stating that the water was not responsible.

Major McCaw suggested that the expression "contact with persons" should be amended to read "contact with persons or with articles soiled by persons in the febrile stage." The conclusions as finally amended were adopted.

The Surgeon-General asked the board's opinion as to a continuation of the investigations of typhoid fever in the District of Colum-

bia. It was the consensus of opinion that the investigation be continued, as it is really national in character. In this investigation it was suggested by Doctor Sedgwick that a small area be studied intensively, and Doctor Wesbrook advised particular attention to contacts.

Surgeon Urie suggested that in making further studies, the so-called ambulatory cases be traced so far as possible.

The chairman of the typhoid-fever board asked whether it was thought advisable to study the viability of the typhoid bacillus, especially in water. Opinion upon the subject, however, was divided.

Upon being asked whether the work should be continued through the calendar year or the typhoid season, the board were unanimous in the opinion that the typhoid-fever season should be studied and not the calendar year.

Doctor Rosenau asked whether it was thought advisable to make an intensive study with special reference to the prevalence of the disease among children. The board was of the opinion that such intensive study should be undertaken.

In expressing appreciation of the scientific work of the laboratory, the board hoped that the work would be greatly extended.

The summary, conclusions, and recommendations, as finally amended, have been published in Hygienic Laboratory Bulletin No. 44, and are as follows:

TYPHOID INVESTIGATION IN THE DISTRICT OF COLUMBIA.

Summary for 1907.

[Six hundred and seventy cases investigated May 1 to November 1, 1907.]

	Cases.	Percent- age.
Infection contracted out of District of Columbia.....	174	25.97
Infection attributed to milk.....	48	7.17
Infection attributed to contact.....	102	15.22
Accounted for.....	324	48.36
Unaccounted for.....	346	51.64
Total.....	670	100.00

Or considering only the 523 cases, of which 363 undoubtedly and 160 probably contracted the infection in the District of Columbia, we have:

	Cases.	Percent- age.
Infection attributed to milk.....	48	9.18
Infection attributed to contact.....	102	19.50
Accounted for.....	150	28.68
Unaccounted for.....	373	71.32
Total.....	523	100.00

To contrast with the above figures the following summary of findings in 1906 is reprinted from Hygienic Laboratory Bulletin No. 35, page 57:

SUMMARY FOR 1906.

[Eight hundred and sixty-six cases investigated June 1 to November 1, 1906.]

	Cases.	Percent- age.
Infection contracted out of District of Columbia.....	129	14.89
Infection attributed to milk or ice cream.....	85	9.81
Infection attributed to contact.....	54	6.23
Accounted for.....	268	30.93
Unaccounted for.....	598	69.07
Total.....	866	100.00

Or, considering only the 747 cases, of which 681 undoubtedly and 66 probably contracted the infection in the District of Columbia, we have:

	Cases.	Percent- age.
Attributed to infection by milk or ice cream.....	85	11.30
Attributed to infection by contact.....	54	7.30
Accounted for.....	139	18.60
Unaccounted for.....	608	81.40
Total.....	747	100.00

The above figures are necessarily not exact, but are approximations based on the findings.

CONCLUSIONS OF TYPHOID FEVER BOARD, SEASON OF 1907.

1. Much of the typhoid fever in the District of Columbia is imported.
 2. Infected milk is one of the important known factors in the spread of the disease in the District of Columbia.
 3. Many cases in the District of Columbia are contracted through contact with persons in the febrile stage of the disease or with articles handled or soiled by persons in the febrile stage. The especial prevalence of the disease among children in the District of Columbia probably has an important bearing on the spread of the infection by contact.
 4. The filtered Potomac River water during the typhoid season of 1907 (May to September) was, according to present bacteriologic standards, of excellent sanitary quality and, so far as could be ascertained, was not responsible for the spread of the infection.
- In the typhoid season of 1907 there were about 200 cases less than in the 1906 period. The bulk of evidence indicates that this improvement in the situation was due to the improvement in the quality of the drinking water; but positive proof of this can not now be established. However, a careful study of typhoid fever in the District of Columbia for the next three to five years will throw much light on the rôle played by the Potomac River water in previous years.

RECOMMENDATIONS OF TYPHOID-FEVER BOARD, SEASON OF 1907.

1. That all milk not certified or inspected shall be pasteurized under official surveillance, especially during the typhoid fever season.

2. The enactment of a law prohibiting the handling or sale of milk or milk products in any dwelling or in any structure so situated as to render contamination of these products especially liable.

3. The enactment of a law prohibiting the care of a case of typhoid fever in any house where foods or beverages liable to convey the infection are sold or prepared for sale.

4. That all cases of typhoid fever and all cases of suspected typhoid fever shall be treated as contagious and dangerous to the community. This should include isolation, placarding, disinfection of the discharges as they leave the body, etc.

5. That in order to furnish a water supply of the highest grade of purity throughout the year, additional storage reservoirs shall be constructed, or a coagulant (alum) shall be used during periods of high turbidity.

6. That laboratory facilities be provided free of cost to aid physicians in the early diagnosis of typhoid fever and also to determine when persons who have had the disease no longer menace the public health by discharging typhoid bacilli.

SIXTH ANNUAL CONFERENCE OF STATE AND TERRITORIAL HEALTH OFFICERS WITH THE UNITED STATES PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

In accordance with the provisions of section 7 of the act of Congress approved July 1, 1902, entitled "An Act to increase the efficiency and change the name of the Marine-Hospital Service," the sixth annual conference of state and territorial health officers with the Public Health and Marine-Hospital Service was held in Washington, D. C., April 27, 1908. There were represented 18 States, 2 Territories, and the District of Columbia.

The conference was called to order at the Bureau of Public Health and Marine-Hospital Service by the Surgeon-General, the officers in charge of the bureau divisions of quarantine and scientific research being present. In his opening address the Surgeon-General stated that the immediate object of the conference was to take into consideration certain interstate quarantine regulations which were in course of preparation, and certain of which it was expected would be promulgated in accordance with section 3 of the act of Congress approved February 15, 1893. The memoranda previously prepared were read section by section by the Assistant Surgeon-General in charge of the bureau division of scientific research, and as read each section was the subject of careful consideration by the conference. It was explained by the Surgeon-General that not all of the data presented would be pertinent for use in drafting interstate quarantine regulations, and it was also stated that in order to insure the enforcement of the proposed interstate quarantine regulations it would be necessary to amend the law of February 15, 1893, and that a bill to this end (H. R. 19998) providing penalties for the infraction of interstate quarantine regulations had been introduced in the House of Representatives.

The attention of the conference was also invited to the public health measure (H. R. 18792; S. 6102), which had been prepared in the bureau and introduced in Congress. The merits of the measure were explained, and emphasis was laid on the fact that it provided in general for field investigations of contagious and infectious diseases, and matters pertaining to the public health, and authorized the co-operation of the Public Health and Marine-Hospital Service with State and Territorial health authorities in their measures for the prevention and suppression of said diseases.

Each section of this bill was the subject of earnest discussion, and all were indorsed by the conference.

Through some misapprehension, a difference of opinion had prevailed with respect to the import of section 5, which provides for the calling of special conferences with one delegate from each of five States with compensation, when it is deemed in the interest of the public health to do so. It was made clear that the section in question would not repeal any previous law, or abridge the powers of conferences already authorized in law. After discussion, this section was amended so that the other States and Territories would be invited to attend such special conference, but at their own expense.

Dr. J. Y. Porter, delegate from Florida, and secretary of the committee appointed at the fifth annual conference to investigate the matter of the franking of public health documents of States and Territories, reported that he had a bill drafted to this end, and submitted the same to the different state boards of health. Having received favorable responses, he stated that through his instance this bill was introduced in the House of Representatives by the Congressman from the First District of Florida. At the time of the conference, however, no action had been taken on this bill, and the committee was continued.

The transactions of the conference have been prepared for publication as have been previous reports of this character.

THIRD INTERNATIONAL SANITARY CONVENTION OF AMERICAN REPUBLICS.

In compliance with the call, published in the annual report for 1907, page 60, the Third International Sanitary Convention of American Republics was held in the City of Mexico, December 2-7, 1907. There were delegates present from 13 republics, Brazil, Colombia, Costa Rica, Cuba, Chile, Guatemala, Honduras, Mexico, Nicaragua, Salvador, United States, and Uruguay.

The meetings were presided over by Dr. Eduardo Liceaga as president, and Dr. Juan Jose Ulloa, secretary, these officers having been elected at the previous convention, held in Washington, October, 1905.

Rules for the conduct of the convention were adopted, and the following vice-presidents were appointed:

Dr. Walter Wyman, of the United States, first vice-president.

Dr. Oswaldo Gonzales Cruz, of Brazil.

Dr. Juan Guiteras, of Cuba.

Dr. E. Soza, of Chile.

Dr. J. H. Esteves, of Guatemala.

Dr. Lazo Arriaga, of Honduras.

Dr. G. Mendizabal, of Nicaragua.

The president of the convention also appointed committees on credentials, advisory, yellow fever, bubonic plague, trachoma, beriberi and cerebro-spinal meningitis, tuberculosis, malaria.

The first session was held on the morning of December 2, 1907, and was addressed by Don Ramon Corral, Vice-President of the Republic of Mexico. Following this address, Doctor Liceaga welcomed the delegates. He reviewed the work of the previous conferences, stating that the first was a congress of hygienists who expressed their adherence to advanced beliefs in sanitary science, and that the second convention reached an agreement ad referendum on measures for defense against plague, cholera, and yellow fever. He referred to the benefits which had followed the adoption of this convention, and urged the republics of America which had not done so to accept the same at an early date. He advocated the adoption of defensive measures against tuberculosis, malaria, beriberi, and other infectious diseases, stating that the logical method is to prevent diseases from originating in the country, and that to this end cities should be provided with good water supply, drainage, sewerage, paving, light, and ventilation, an absence of overcrowding of buildings, so that they will not be invaded by transmissible diseases.

Doctor Liceaga also reviewed the sanitary work in Mexico, particularly with reference to the eradication of yellow fever and bubonic plague. These latter achievements were recited to demonstrate how great is the obligation under which all the republics stand to attend to the sanitation of their cities, and not only of the great centers of population but also the smallest ones. Reports were received from the delegates regarding the progress of sanitation in their respective countries.

Discussions were had on yellow fever, malaria, plague, and cholera. Trachoma, as it affects the immigrant, received consideration. Doctor Liceaga stated that in Mexico an immigration law was being prepared which had for its object the exclusion of persons suffering with tuberculosis or other transmissible disease. He believed that if all the American Republics would adopt measures for preventing the admission of immigrants sick or incapacitated for work it would contribute materially toward hygienic and social conditions in the various countries.

Measures for preventing the transmission of tuberculosis in railway trains, and ships, received attention. Doctor Liceaga mentioned the use of metallic plates, heated by electricity or other means, for burning the expectoration of tuberculous travelers. He stated that on railroad cars a special place might be provided, with a receiver where the passengers could expectorate, the sputum to be carried off by a current of water or destroyed by heat. During this discussion a number of resolutions were adopted relating to the practices which should prevail to prevent the dissemination of this disease through travelers.

Prior to the adjournment, December 7, 1907, it was determined to hold the Fourth International Sanitary Convention at San Jose, Costa Rica, December 25, 1909. Dr. Juan Jose Ulloa was elected president of the coming convention, and the officers of the international sanitary bureau, of Washington, were elected to continue in office.

The resolutions adopted by the convention are as follows:

1. The representatives of the governments of Brazil, Colombia, and of Uruguay are asked to adhere to the sanitary convention which was signed in Washington in 1905.

2. To the American governments represented in this convention is recommended the codifying of all sanitary laws and regulations of the respective countries, and as soon as this is accomplished, to forward copies of them to the international sanitary bureau at Washington.

3. The convention is recommended to authorize the international sanitary bureau of Washington to establish by means considered by them to be most convenient, corresponding relations with the international sanitary bureau, of Paris, in accordance with the declaration made by the third Pan-American Congress held in Rio de Janeiro, August, 1906.

4. That the secretary be authorized to include in the publications of the proceedings of the third international sanitary convention a summary of all the resolutions adopted by the first and second international sanitary conventions held in Washington.

5. That recommendations be made to the American governments of the convenience of agreeing upon compulsory vaccination against smallpox.

6. That recommendations be made to the governments represented in this convention of the convenience of declaring free from state taxes the sale of quinine, fine wire mosquito netting to be used as a protection against mosquitoes, crude petroleum, mosquito bars, and material used for that purpose.

7. That recommendations be made through the medium of the respective authorities that the governments enter into a most active propaganda on the etiology, prophylaxis, and treatment of malaria, and resolve upon the establishment of public conferences on these subjects in schools, shops, barracks, etc.

8. That recommendations be made for the establishment of centers at necessary points for the free distribution of quinine to the poor in necessary quantities for the prophylaxis of malaria.

9. That recommendations may be made to the governments that they order the maritime sanitary authorities to include in the public health reports which they issue the mortality occasioned by malaria.

10. That recommendations be made to all governments alike, for the publication of a pamphlet in which is compiled in a brief, simple, and practical form, easily understood by the public, facts concerning malarial fever, for liberal distribution.

11. Omitted.

12. That recommendations be made to the governments that they prohibit the immigration of persons suffering from trachoma and beriberi.

13. That recommendations be made to the various American nations for the legal and adequate steps in favor of the nationalization and centralization of sanitary authorities.

14. That to the American governments be recommended the following suggestions for the prevention of tuberculosis in railway cars and steamships:

- a. To avoid, as far as possible, the use of carpets and fixed curtains.
- b. To recommend the use of spittoons well distributed.

c. Periodical disinfection of cars and staterooms, including furniture, beds, washbowls, linen, etc. These disinfections should especially be made in the third-class passenger quarters. All clothing, including napkins, should be disinfected before being washed.

d. Disinfection of dining room service and the use of paper envelopes or covers for napkins used by passengers; also that food be covered with screens; that doors and windows of railroad cars, staterooms, and habitations on vessels be screened with fine wire netting to avoid the introduction of flies.

e. The examination of employees of passenger trains and vessels in order that tuberculosis subjects are not employed.

f. All vessels should have a special and comfortable department for the accommodation of tuberculosis patients, its construction not to admit of the retention of dust in any part.

g. The pasting of notices in public places condemning the habit of spitting on floors.

h. Recommending that physicians on board a vessel be not only titled in their profession, but if possible, to have a special knowledge of the prophylaxis of tuberculosis.

INTERNATIONAL OFFICE OF PUBLIC HYGIENE, PARIS.

In the annual report for 1907, on page 63, a brief reference is made to the contemplated organization of an International Bureau of Public Hygiene at Paris. The establishment of this bureau was provided for in article 181 of the international sanitary convention signed ad referendum at Paris December 3, 1903, and the Government of France was intrusted with the task of presenting to the interested nations propositions regarding the organization of the above-mentioned bureau. A draft of by-laws to govern this new institution was accordingly prepared and submitted to the signatory powers, and with the view to facilitating the exchange of propositions of the various governments concerned, regarding the organization in question, a conference was invited by the Government of the French Republic at the instance of the Government of the kingdom of Italy. This conference was called December 3, 1907, the United States being represented by Passed Asst. Surg. A. J. McLaughlin, of the Public Health and Marine-Hospital Service, and Mr. R. S. Reynolds Hitt, first secretary of the embassy at Rome.

These delegates were duly accredited by the Department of State and empowered to sign ad referendum with such reservations as were deemed necessary and proper the formal arrangement adopted at the conference in Rome. The Governments of Belgium, Brazil, Spain, France, Great Britain, British India, Italy, Holland, Portugal, Roumania, Russia, Switzerland, and Egypt were also represented by delegates.

At the first meeting, held December 3, 1907, delegates were welcomed on behalf of the Italian Government by Signor Tittoni, minister for foreign affairs of Italy. Monsieur Camille Barrere, the French ambassador to Italy, was elected president of the conference, and opened the proceedings by formally presenting the project for the organization of the bureau prepared by the French Government and submitted in August, 1907, to the powers signatory to the sanitary convention of Paris signed December 3, 1903. This project was

taken as a basis, although an alternative project had been prepared and was submitted by the Italian sanitary authorities. It was determined that the name of the new institution should be the "Office International d'Hygiene Publique."

The discussions included consideration of the scope of the proposed bureau, the methods of communicating between the various governments, their status, and the annual expenses, and their distribution among the various governments for the maintenance of the bureau.

The delegate from Roumania made objection to the bureau having purview over all infectious diseases, and wished to limit its operations to the three diseases—plague, cholera, and yellow fever. He also considered that the bureau in dealing directly with the superior health authorities would interfere too much in the local affairs of the various States, and recommended that the operations of the bureau be conducted only through diplomatic channels. He also considered that, according to the Paris Convention of 1903, this bureau should be modeled after the International Bureau of Weights and Measures, and hence each nation represented would have one vote regardless of the amount contributed to the maintenance of the bureau.

It will be observed below that article 11 of the statutes divides the various countries into six categories for the purpose of sharing the annual expenses. The various countries, therefore, contribute 25, 20, 15, 10, 5, or 3 units, depending upon their rating as given above. The French project placed the amount of the annual budget at 150,000 francs, and it was decided to fix the sum at this amount, which is not to be exceeded under any circumstances except with the consent of the signatory powers. The Government of the United States, being classed in the first category, will contribute 25 units. When the total number of units is known, it will be easy to determine the precise amount of the annual contribution of each country.

Resolution 3 D, adopted by the Third International Conference of American States, August, 1906, which reads as follows, was presented for consideration of the conference:

Recommending: "The establishment of relations between the International Sanitary Bureau now existing in Washington and the Bureau Sanitaire International, of Paris, in order to obtain the best information on sanitary subjects and to reach agreements that will facilitate the objects with which both offices are established."

The conference expressed, through its president, unanimous approval of the sentiment contained in this resolution. The president consulted the conference and replied in its name that there was no doubt that article 2 of the statutes authorized the direct communication which would be the fulfillment of the desire expressed in the above resolution adopted at Rio de Janeiro. It was decided that the arrangement remain in force seven years, and if not denounced one year previous to the termination of such period, continues binding for another period of seven years on the same conditions.

The arrangement and organic statutes, as finally edited, were signed December 9, 1907, by the delegates of all the countries represented, with the exception of the delegate from Roumania. This delegate, in the name of his Government, objected, as stated above, particularly to the fact that under the arrangement the different countries would be entitled to votes in proportion to their annual contributions to the maintenance of the bureau.

The original arrangement and statutes signed ad referendum were deposited with the Government of Italy, which was intrusted with the task of notifying the signatory powers. This arrangement was ratified by the President of the United States, by and with the advice of the Senate, February 15, 1908, the text of which reads as follows:

ARRANGEMENT SIGNED AT ROME DECEMBER 9, 1907.

The Governments of Belgium, Brazil, Spain, the United States, the French Republic, Great Britain and Ireland, Italy, the Netherlands, Portugal, Roumania, Russia, Switzerland, and the Government of His Highness the Khedive of Egypt, having judged it useful to organize the International Office of Public Hygiene contemplated in the Sanitary Convention of Paris, under date of December 3, 1903, have resolved to conclude an arrangement to this effect and have agreed as follows:

ARTICLE 1. The high contracting parties engage to found and maintain an international office of public hygiene, of which the seat shall be at Paris.

ART. 2. The office operates under the authority and control of a committee formed of delegates of the contracting governments. The composition and attributions of this committee, as well as the organization and the powers of the said office, are determined by the organic statutes which are annexed to the present arrangement and are considered as forming an integral part of it.

ART. 3. The cost of installation as well as the annual expense of operating and maintaining the office is covered by the contributions of the contracting states as established by the conditions proposed by the organic statutes contemplated in article 2.

ART. 4. The amounts representing the contributive part of each of the contracting states are paid over by these latter at the commencement of each year through the intermediary of the ministry of foreign affairs into the government deposit and consignment office, from which they shall be drawn out as needed on order of the director of the office.

ART. 5. The high contracting parties reserve the right of applying to the present arrangement, by common accord, such modifications as experience shall demonstrate to be useful.

ART. 6. The Governments which have not signed the present arrangement are admitted to adhere to it on their request. This adhesion shall be notified through diplomatic channels to the Royal Government of Italy and by it to the other contracting governments; it will include the obligation to participate in the expense of the office, under the conditions contemplated by article 3.

ART. 7. The present arrangement shall be ratified and the ratifications shall be deposited at Rome as soon as possible; it shall be put in execution from the date at which the deposit of the ratifications shall have been effected.

ART. 8. The present arrangement is concluded for a period of seven years. At the expiration of this term it will continue in force for new periods of seven years among the states which shall not have notified, one year before the expiration of each period, the intention to cause it to go out of effect as far as they are concerned.

On the strength of which the undersigned, duly authorized, have concluded the present arrangement, which they hereby invest with their seals.

For Belgium:

E. BECO,
O. VELGHE.

For Brazil:

Dr. EGIDIO DE SALLES GUERRA.
Dr. HENRIQUE DE ROCHA
LIMA.

For Spain:

MANUEL DE TOLOSA LATOUR,
PABLO SOLER.

For the United States:

A. J. McLAUGHLIN,
R. S. REYNOLDS HITT.

For France:

CAMILLE BARRERE,
J. DE CAZOTTE,
E. R. RONSSIN.

For Great Britian:

THEODORE THOMPSON,
B. FRANKLIN.

For Italy:

ROCCO SANTOLIVIDO,
ADOLFO COTTO.

For the Netherlands:

H. DE WEEDE.

For Portugal:

M. DE CARVALHO E VAS-
CONCELLOS.

For Russia:

BARON KORFF.

For Switzerland:

J. B. PIODA.

For Egypt:

IBRAHIM NEGUIB,
MARC ARMAND RUFFER.

ORGANIC STATUTES OF THE INTERNATIONAL OFFICE OF PUBLIC HYGIENE.

ARTICLE 1. There is instituted at Paris an International Office of Public Hygiene amenable to the States which agree to take part in its operation.

ART. 2. The office can not in any way concern itself in the administration of the several States.

It is independent of the authorities of the country in which it is placed.

It corresponds directly with the superior authorities of hygiene of the several countries and with the sanitary councils.^a

ART. 3. The Government of the French Republic will take, on request of the international committee contemplated by article 6, the necessary measures to cause the office to be recognized as an establishment of public utility.

ART. 4. The principal object of the office is to collect and bring to the knowledge of the participating States facts and documents of a general character interesting to public health, especially as concerns infectious diseases, notably cholera, plague, and yellow fever, as well as the measures taken to combat those diseases.

ART. 5. The Governments inform the office of the measures which they will take to insure the application of international sanitary conventions. The office suggests the modifications which it may be advantageous to apply to the terms of these conventions.

^a It is understood that the term "sanitary councils" applies to the councils of Alexandria, Constantinople, Tangier, Teheran, and to all other councils which may be charged with the application of international sanitary conventions.

ART. 6. The office is placed under the authority and control of an international committee, which is composed of technical representatives, designated by the participating States at the rate of one representative for each State.

There is assigned to each State a number of votes inversely proportioned to the number in the category to which it belongs as concerns its share in the expense of the office. (See art. 2.)

ART. 7. The office committee meets periodically at least once a year. The duration of the sessions is not limited.

The members of the committee elect, by secret ballot, a president, whose term of office has a duration of three years.

ART. 8. The operation of the office is assured by a paid personnel, comprising: A director and a secretary-general, the necessary agents for the business of the office.

The personnel of the office shall not fill any other paid function.

The director and the secretary-general are named by the committee.

The director assists at the meetings of the committee with a consultative vote.

The nomination and revocation of employees of all grades belongs to the director, who renders an account thereof to the committee.

ART. 9. The information collected by the office is brought to the knowledge of the participating States by means of a bulletin or by special communications addressed to them by the office, or on demand.

The office, in addition, makes a statement, periodically, of the results of its activity, in special reports which are communicated to the participating governments.

ART. 10. The bulletin, which appears at least once a month, comprises chiefly:

1. The laws and regulations, general or local, promulgated in the several countries concerning transmissible diseases.

2. Information concerning the progress of infectious diseases.

3. Information concerning work carried out or measures taken for the sanitation of localities.

4. Statistics relative to public health.

5. Bibliographical notes.

The official language of the office and the bulletin shall be French. The committee may decide that parts of the bulletin shall be published in other languages.

ART. 11. The expenses necessary for the operation of the office, estimated at 150,000 francs per annum, are covered by the States signatory to the convention, the contributions of which are fixed according to the following categories:

First category: Brazil, Spain, United States, Great Britain, British India, Italy, Russia, at the rate of 25 units.

Second category: At the rate of 20 units.

Third category: Belgium, Egypt, Netherlands, at the rate of 15 units.

Fourth category: Switzerland, at the rate of 10 units.

Fifth category: At the rate of 5 units.

Sixth category: At the rate of 3 units.

This sum of 150,000 francs can not be exceeded without the consent of the signatory powers.

It is allowable to any State to enroll itself ultimately in a superior category.

The States which shall ultimately adhere to the convention will choose the category in which they desire to enroll themselves.

ART. 12. There is levied on the annual receipts a sum destined to constitute a reserve fund. The total of this reserve, which can not exceed the amount of the annual budget, is placed in the state funds of the first order.

ART. 13. The members of the committee shall receive from the fund appropriated to the operation of the office an indemnity for the cost of change of place. They shall receive, moreover, a fee for each of the sessions at which they assist.

ART. 14. The committee fixes the sum to be levied annually on its budget for contribution to secure a pension on retirement for the personnel of the office.

ART. 15. The committee establishes its annual budget and approves the report of expenses. It controls the organic regulation of the personnel, as well as all measures necessary for the operation of the office.

The said regulation and measures are communicated by the committee to the participating States and can not be modified without their consent.

ART. 16. A statement of the administration of the funds of the office is presented annually to the participating States after the close of the exercises.

The signatures to this statement of the organic statutes of the office are the same and are subscribed in the same order as those for the preceding arrangement.

INTERNATIONAL CONGRESS ON TUBERCULOSIS AT WASHINGTON, D. C.

In response to an invitation extended by the National Association for the Study and Prevention of Tuberculosis at the international congress held in Paris in 1905, it was decided to hold the next congress in the United States. Washington was selected as the principal meeting place, and the above-mentioned association created a national committee, which was charged with the organization and conduct of the congress. Preliminary steps were taken by this committee on January 26, 1907, to secure the participation of the Federal Government in the congress by making an exhibit showing its relation to the warfare against tuberculosis. Representations were made by the committee to the Department of State estimating that the expenditures connected with these various exhibits would amount to approximately \$25,000. In a letter dated January 29, 1907, the Secretary of State inquired whether it was deemed advisable and practicable for the Public Health and Marine-Hospital Service to make an exhibit. He was informed that it was practicable to make the exhibit, that it was deemed in the interest of the public health to do so, and that the sum of \$4,000 would be sufficient for the purpose. This sum was included with other estimates made by the various departments for a like purpose and submitted to Congress by the Secretary of State with the request that the necessary sum be appropriated in order that the Government might suitably participate in the congress.

In accordance with these recommendations, the diplomatic and consular act approved May 21, 1908, contains the following appropriation:

To enable the Government of the United States suitably to participate in the International Congress on Tuberculosis which will convene at Washington September 21 to October 12, 1908, \$25,000.

The control of this appropriation and the arrangements for the participation of the United States was placed in the hands of a committee composed of representatives of the departments interested, and Asst. Surg. Gen. A. H. Glennan was designated to represent the Treasury Department on the committee. A meeting of this committee was held July 8, 1908, at which the allotments were made, the Public Health and Marine-Hospital Service being allotted \$4,000. In the meantime preliminary steps had been taken to prepare and assemble an exhibit, and the Director of the Hygienic Laboratory was charged with the arrangements, he being authorized to communicate with officers of the service and others with the view to securing their cooperation.

The exhibit as planned included a model of the Marine Hospital Sanatorium, Fort Stanton, N. Mex., photographs showing the physical features of that station and its advantages from climatic and other standpoints, the use of the X rays as an adjunct in the diagnosis and treatment of tuberculosis, a reflectoscope for giving demonstrations, cartographs, etc.

It was recognized that the Government should invite foreign governments through their ministries to participate in the International Congress on Tuberculosis and in the exhibition. The following resolution was therefore passed by Congress and approved March 6, 1908:

Whereas an International Congress on Tuberculosis will meet in Washington in September, 1908, the same being the Sixth International Congress on Tuberculosis, and the first to be held in America; and

Whereas seven of the nine departments of Federal Government have petitioned Congress for the authority and means to participate in this congress; and

Whereas the governors of twenty-eight States of the United States have authorized the participation of their several States in this congress; and

Whereas the National Association for the Study and Prevention of Tuberculosis has provided the necessary means and created a special committee to secure the participation of voluntary and private interests in the coming International Congress on Tuberculosis; and

Whereas preceding international congresses occurring in other countries in the past fifteen years have been held under governmental auspices and delegates from the United States have participated therein as guests of foreign governments; therefore, be it

Resolved by the Senate (the House of Representatives concurring), That the Department of State of the United States be, and is hereby, authorized to invite the governments of other countries, through their ministries, to send representatives to the International Congress on Tuberculosis, to be held in Washington September 21 to October 12, 1908.

It was deemed advisable by the secretary-general of the congress that the preliminary correspondence inviting the organization of national committees abroad should be forwarded through official channels, and the same was forwarded by this department to the Department of State for transmission to its destination by our diplomatic and consular officers abroad.

The organization of the congress included seven sections, Section VI being devoted to the consideration of state and municipal control of tuberculosis. The Surgeon-General was president of this section,

and the Assistant Surgeon-General in charge of the Division of Scientific Research its secretary. This duty involved a large amount of correspondence with the result that the deliberations of the section covered practically all of the phases of the subject of state and municipal control of tuberculosis.

Nine sessions were arranged for, during which more than forty papers were presented, and there were represented on this programme alone representatives from sixteen countries.

This congress was a notable event, not only from a national, but an international standpoint. The vast humanitarian importance of its work rendered it worthy of the patronage of the Government. Its deliberations have undoubtedly done more for the extension of modern scientific ideas as to the methods of dealing with tuberculosis, and they should have a continued influence for the prevention of sickness and death from this disease and for the more thorough administration of laws and regulations for the improvement of the public health.

DOMESTIC QUARANTINE.

QUARANTINE AGAINST CUBA.

Under the provisions of a department circular dated March 4, 1908, quarantine was imposed upon ports in the island of Cuba, to begin April 1, on account of the presence of yellow fever and uneasiness as to the prevalence of the disease in various parts of the island. Upon representations made by the provisional government of the United States in the island, it was directed by the President that the imposition of the close quarantine against Cuba should be postponed for one week until April 6, 1908, at which time it again went into effect. In the interval, however, between March 30 and April 6, an agreement was reached by which the city of Habana, Marianao, and the Base Camp Columbia, near the city of Habana, were excluded from the provisions of the quarantine, and residence in any of these localities for a period of six days prior to embarkation was to be accepted in lieu of quarantine detention in the camp at Triscornia, in the Harbor of Habana, as had been required in previous years.

The theory of the bureau in regard to the necessity for the imposition of a quarantine against ports in the island of Cuba was based upon the continued appearance of cases of yellow fever in various parts of the island, a case having occurred as late as February 18, 1908, and this case was subsequently followed by cases in Santiago de Cuba on April 21, May 13, and June 4, 1908, after the establishment of quarantine, and a justification of its establishment. In addition the season in Cuba at the time of the usual period for establishing quarantine was one of exceptional dryness, unfavorable to the development of mosquitoes, and the position was taken that not only would the advent of the rainy season be followed by an increase in the number of mosquitoes, and consequent dread of the danger of infection, but that there was also danger from the existence of continued mild, unrecognized cases of the disease, which even if recognized, would possibly not be reported to the sanitary authorities in time to enable the taking of proper precautions against them.

Both contentions have been justified. Upon the advent of the seasonal rains mosquitoes increased in number, and on June 11, 1908, another case of yellow fever was reported from Santiago de Cuba, which was proved to be due to importation from Daiquiri.

On July 4, 1908, another case of yellow fever at Santiago from Daiquiri was reported, which terminated in death on July 6. On July 7, still another was reported at Daiquiri, and on the 8th information was received in the bureau of the recognition of convalescent cases, the existence of which had not previously been reported.

It was further reported that an officer of the Cuban sanitary de-

partment, in visiting Daiquiri to inquire into the circumstances of the outbreak, found evidence to justify the conclusion that the disease had prevailed continuously at that place since April; this, in spite of the fact that an inspection of the sanitary conditions prevailing in various parts of the island had only recently been completed by an officer of the sanitary department, and had been reported upon as excellent. But this officer had visited Santiago only, and had failed to inspect or investigate Daiquiri.

On July 24 a cablegram announced the occurrence of three new cases of yellow fever at Daiquiri, and on July 5 a case of yellow fever was removed at the quarantine station at San Juan, Porto Rico, in the person of a passenger from the Cuban steamship *Julia*, which case was subsequently found to have originated at Daiquiri.

For the period from June 27 to August 15, 1908, there were twenty cases of yellow fever at Daiquiri, with four deaths. On September 8 a case was reported at Antilla in Santiago Province, resulting in death, and also a case at Firmeza, Santiago Province, on August 22. On September 7 there was a case in the city of Santiago, subsequently proving to be due to importation from Mayari. This went to prove that the Province of Santiago was thoroughly infected with yellow fever. On September 10 quarantine restrictions were removed from the Provinces of Santa Clara and Camaguey, leaving at this date the old Province of Santiago, now Oriente, alone under suspicion.

On September 14, however, a secondary case of yellow fever was reported in the person of a Spaniard in a district of Habana where mosquitoes were abundant, and near the Machina wharf. In consequence of this case, on September 16, 1908, quarantine restrictions as imposed in past years were put into effect against departures from Habana for southern ports of the United States. These restrictions imposed a minimum of hardship. There was no interdiction of the embarkation of immune passengers on presentation to the service officer at Habana of proofs of their immunity. Nonimmune passengers destined for Florida points were detained six days, and for other southern ports five days, under good hygienic surroundings and were comfortably cared for at Triscornia on the opposite side of the bay from the city of Habana. Arrangements were made for lightening the restrictions upon military passengers on army transports by considering Camp Columbia, near Habana, a noninfected point. The restrictions against Habana were removed as soon as possible, after the lapse of eighteen days from the date of the case, and restrictions were removed as fast as satisfactory evidence of sanitary conditions could be obtained from other Provinces, finally again leaving Santiago Province alone under suspicion in the island.

The ban was lifted from whole Provinces as rapidly as reliable information could be received as to sanitary conditions and the occurrence of febrile diseases in them. The quarantine was raised finally from Santiago Province October 20, from which date no special quarantine measures have been enforced with regard to Cuba.

It was contended that the imposition of quarantine against Cuba was in violation of Article IX of an international sanitary convention concluded at Washington on October 14, 1905, the signing of which was duly ratified both by Cuba and the United States.

The provision of Article IX with regard to yellow fever in the said convention is as follows:

That an area should no longer be considered as infected, official proof must be furnished, first, that there has neither been a death nor any case of plague or cholera for five days after isolation, death, or cure of the last plague or cholera case. In case of yellow fever the period should be eighteen days, but each Government may reserve the right to extend that period.

It was under the terms of this provision that the quarantine against places in Cuba was imposed. In the discussions by the convention preliminary to its adoption Doctor Guiteras as the Cuban delegate said:

We have discussed the question of whether one case of yellow fever should be considered as sufficient reason for declaring an area contaminated, and the Spanish-speaking delegates of the convention seem to be of the opinion that one case ought to be enough to cause the place to be declared infected.

The president of the convention remarked:

I believe that the English-speaking delegates will concur with them.

Doctor Guiteras then replied:

Then it stands as a whole.

Further in the discussions the Cuban delegate in explaining as to why eighteen days since the last case had been adopted as the time limit for quarantine restrictions said:

Now we have added here the provision that the authorities might extend that period of expectancy or waiting before declaring a place free from yellow fever; that they may extend it *ad libitum*, because we have considered that at certain places where yellow fever regularly prevails—that is, is endemic—the number of immune people is so great that there might be a large number, or a quite considerable number of mosquitoes lurking in that locality without invoking yellow fever because of the immunity of the inhabitants, and we might be surprised at any time by a case of yellow fever. We have therefore allowed this freedom to the authorities to extend this period—to extend it the whole length of the yellow-fever season, or the whole summer if they desire. At any rate we have given them the freedom to extend this period.

It will therefore be clearly seen that there was no violation of either the letter or the spirit of the international convention. The extension of the eighteen-day period had been anticipated and had been provided for, and most fully and carefully explained by the delegate from Cuba.

REPORTS FROM THE NATIONAL QUARANTINE STATIONS.

During the fiscal year ending June 30, 1908, at the various quarantine stations of the United States, a total of 9,579 vessels were inspected, and 733 were disinfected, either for the destruction of mosquitoes as a precaution against the introduction of yellow fever, or for the destruction of rats and other vermin as a precaution against plague. In addition 923 vessels were spoken and passed, making a grand total of 11,235 vessels passing under the observation of the service at the ports in the continental United States.

Following are the summaries of the operations at the various quarantine stations:

Eastport, Me., quarantine.—Acting Asst. Surg. E. M. Small in charge.

Three vessels were spoken and passed, and 902 steamers and 75 sailing vessels were inspected. These vessels carried a total of 33,501

passengers and 22,848 crew. There were no quarantinable diseases at the station.

Portland, Me., quarantine.—Surg. P. C. Kalloch in command.

One hundred and sixty steamers and 21 sailing vessels were inspected and passed. The sailing vessels carried crews of 181, and the steamers carried 7,383 crew and 3,398 passengers. There were no cases of quarantinable disease during the year.

Perth Amboy, N. J., quarantine.—Acting Asst. Surg. Chas. W. Naulty, jr., in charge.

Six vessels were spoken and passed. Seven sailing vessels were inspected and passed and 41 steamers were inspected. There were 80 crew on sailing vessels and 1,075 crew on steamers. On the steamers were 7 stowaways. During the year there were no cases of quarantinable disease.

Reedy Island quarantine.—Post-office address, Port Penn, Del.; telegraphic address, Reedy Island, Del. Passed Asst. Surg. W. A. Korn in command.

Twelve vessels were spoken and passed, 1,067 steamers were inspected and passed, and 4 steamers were fumigated; 127 sailing vessels were inspected. Upon the steamers were 40,361 crew and 19,756 passengers; upon the sailing vessels 1,418 crew. Three outward-bound vessels were disinfected upon request of the agents. The steamship *Vienna*, from Sourabaya, arrived, having had a death from smallpox on board, and the steamship *Canterbury* arrived from Bombay with a case suspicious of plague on board. The vessel was fumigated and released, while the officers and crew were detained seven days for observation.

Delaware Breakwater quarantine.—Post-office and telegraphic address, Lewes, Del. Asst. Surg. Edward R. Marshall in command.

Seventy-nine steamers were inspected and passed and 1 steamer was remanded to Reedy Island for disinfection; 39 sailing vessels were inspected and passed. The steamers carried 2,556 crew and 44 passengers and the sailing vessels had 493 crew and 9 passengers. One case of smallpox was removed from the British steamship *Vienna*.

Alexandria, Va., quarantine.—Acting Asst. Surg. Arthur Snowden in charge.

Two steamers and 9 sailing vessels were inspected and passed, with a total of 97 crew. There were no quarantinable diseases.

Cape Charles quarantine.—Post-office and telegraphic address Fort Monroe, Va. Asst. Surg. G. L. Collins in command.

Six vessels were spoken and passed, 415 steamers were inspected, and 38 steamers were disinfected; 15 sailing vessels were inspected and 2 disinfected. On the steamers there were 16,732 crew and 3,238 passengers and on the sailing vessels 135 crew, making a total of 20,101 persons inspected. There was no occurrence of quarantinable disease.

Cape Fear quarantine.—Post-office and telegraphic address, Southport, N. C. Passed Asst. Surg. E. K. Sprague in command.

Two vessels were spoken and passed. Forty-two vessels—38 steamers and 4 sailing vessels—were inspected and passed, and 4 steamers and 1 sailing vessel were disinfected. These vessels carried a total of 1,163 crew, with no passengers. The vessels disin-

fected were from ports of Cuba and from Bahia, Brazil. There were no cases of quarantinable disease.

Georgetown, S. C., quarantine.—Acting Asst. Surg. J. William Folk in charge.

Five vessels, with a total of 32 crew, were inspected and passed. There were no cases of quarantinable disease.

Charleston, S. C., quarantine.—Passed Asst. Surg. Baylis H. Earle in command.

One vessel was spoken and passed; 9 sailing vessels and 115 steamers were inspected and passed, and 3 steamers were disinfected. These vessels carried a total of 3,538 crew and 54 passengers, among the latter being 4 stowaways. There were no cases of quarantinable disease.

Beaufort, S. C., quarantine.—Acting Asst. Surg. Christopher G. Hay in charge.

One vessel was spoken and passed, and 8 steamers and 4 sailing vessels were inspected and passed; 1 steamer was disinfected. Upon the above vessels there was a total of 285 crew and 1 passenger, and no quarantinable diseases occurred.

Port Royal, S. C., quarantine.—Acting Asst. Surg. William P. Gibbes in charge.

Three sailing vessels with 24 crew were inspected and passed.

Savannah, Ga., quarantine.—Asst. Surg. Hugh de Valin in command.

Five vessels were boarded and passed, 74 were inspected and passed, and 146 were inspected and passed. Six vessels were fumigated and released, and 6 fumigated and held to complete five days from port of departure. These vessels carried a total of 4,191 crew and 788 passengers, and no quarantinable disease was found.

South Atlantic quarantine.—Post-office address, Inverness, Ga. Telegraphic address, Darien, Ga. Passed Asst. Surg. M. K. Gwyn in command.

Four steamers and 2 sailing vessels were inspected and passed and 1 steamer disinfected. These vessels carried a total of 152 crew. There were no cases of quarantinable disease.

Brunswick, Ga., quarantine.—Asst. Surg. R. D. Spratt in command.

Thirty vessels were spoken and passed, 35 steamers and 58 sailing vessels were inspected and passed, and 5 sailing vessels were disinfected. These vessels carried a total of 1,542 crew and 171 passengers. There were no cases of quarantinable disease.

Tampa Bay, Fla., quarantine.—Post-office address, Fort De Soto, Fla. Telegraphic address, via Palmetto, Fla. Passed Asst. Surg. H. McG. Robertson in command.

One steamer was spoken and passed, 101 steamers and 64 sailing vessels were inspected and passed, and 40 steamers and 45 sailing vessels were disinfected. These vessels carried a total of 93 passengers and 4,786 crew. There were no cases of quarantinable disease, but 17 cases of illness on board vessels were the subject of observation.

Cumberland Sound quarantine.—Post-office and telegraphic address, Fernandina, Fla. Acting Asst. Surg. J. Louis Horsey in charge.

One hundred and eighteen vessels were spoken and passed; 110 steamers were inspected and passed, and 3 steamers were disinfected; 44 sailing vessels were inspected and passed, and 9 sailing vessels

were disinfected. On these vessels there were 3,631 crew and 21 passengers. There were no cases of quarantinable disease.

St. Johns River quarantine.—Post-office and telegraphic address Mayport, Fla. Acting Asst. Surg. W. D. Bell in charge.

Fifteen steamers and 233 sailing vessels were inspected and passed. On these vessels there were 7 passengers and a total of 1,549 crew. There were no quarantinable diseases.

Biscayne Bay quarantine.—Post-office and telegraphic address Miami, Fla. Acting Asst. Surg. James M. Jackson in charge.

Two hundred and seventy-two vessels were spoken and passed; 92 steamers were inspected and passed, and 55 sailing vessels were inspected and passed. These vessels carried crews, 4,350, and 3,610 passengers. There were no cases of quarantinable disease.

Key West, Fla., quarantine.—Acting Asst. Surg. S. D. W. Light in charge.

During the year 325 vessels of all classes were inspected and passed, and 18 vessels were disinfected and held for observation.

Bocagrande quarantine.—Post-office and telegraphic address Punta Gorda, Fla. Acting Asst. Surg. W. Barnes in charge.

During the year 15 vessels were spoken and passed, and 3 sailing vessels were inspected and passed.

Pensacola, Fla., quarantine.—Acting Asst. Surg. R. C. White in charge.

During the year 56 vessels were boarded and passed, 32 vessels were spoken and passed, 74 steamers were inspected and passed, and 11 steamers were disinfected; 74 sailing vessels were inspected and passed, and 26 sailing vessels were disinfected. On these vessels there were 7,929 crew and 48 passengers, and while no cases of quarantinable disease occurred, 14 cases of malarial fever, remittent, were removed to the hospital at the station and treated.

Mobile, Ala., quarantine.—A total of 772 vessels was inspected and passed, of which 539 were steamers and 233 were sailing vessels; 77 vessels were detained in quarantine. On these vessels were 13,980 crew, and 578 passengers. Fourteen cases of malarial fever were removed from vessels for observation and treatment, but no cases of quarantinable disease occurred.

Supplemental inspection service, Mobile, Ala.—An inspection service similar to that conducted in New Orleans was also conducted during the fiscal year at the port of Mobile.

During the fiscal year 1,126 vessels, with 21,696 crew and 787 passengers, were examined, and 164 passengers destined for New Orleans were notified to Surgeon White, at that point.

Pascagoula, Miss., quarantine.—Acting Asst. Surg. B. F. Duke in charge.

Fifteen vessels were spoken and passed; 21 steamers and 128 sailing vessels were inspected and passed, and 2 sailing vessels were disinfected. These vessels carried a total of 1,770 crew and 12 passengers. There were no cases of quarantinable disease.

Gulf Quarantine Station.—Post-office and telegraphic address, Biloxi, Miss. Passed Asst. Surg. C. W. Wille in command.

The station is located on Ship Island, about 12 miles off the Mississippi shore, and separated from the mainland by the Mississippi Sound. The quarantine station proper, with its anchorage for infected and possible infected vessels, is located on the north shore of

the island, at about its mid point. The inspection station is at the west end of the island, about 4 miles distant from the station proper. This latter station is maintained for the inspection of presumably noninfected vessels only.

The station is available for ports of Mississippi—Gulfport, Pascagoula, Scranton, and Moss Point—also for infected vessels which may be remanded from other Gulf stations.

Boarded and passed, steamers 20, sailing vessels 8; inspected and passed, steamers 65, sailing vessels 68; inspected and held, steamers 10, sailing vessels none; fumigated and passed, steamers 9, sailing vessels 21; fumigated and held, steamers 3, sailing vessels 39. The above vessels carried a total of 3,520 crew, and 42 passengers. The following diseases were detected among the crew and the necessary attention given aboard ship: Malarial fever, 18; dysentery, 2; enteric, 2; tubercle, 1; rheumatism, 3; smallpox, 1; herpes zoster, 1; beriberi, 4. One case each of enteric and smallpox were moved from the vessels upon which they occurred and entered as hospital cases, a list of which follows: Smallpox, 3; malarial fever, 2; enteric fever, 1.

New Orleans Quarantine.—Post-office address, Quarantine, La. Telegraphic address, via New Orleans, La. Passed Asst. Surg. R. H. von Ezdorf, in command.

• Nine hundred and eighty-eight steamers and 19 sailing vessels were inspected; 5 sailing vessels and 756 steamers were inspected and passed; 8 steamers were inspected and held for the completion of diagnosis of cases of sickness found on arrival; 14 steamers and 10 sailing vessels were inspected and detained; 80 steamers were inspected and held to complete a period of 5 days from fumigation at a foreign port; 222 steamers and 14 sailing vessels were fumigated and disinfected. In addition 6 foreign and United States naval vessels were boarded and passed. Upon these vessels of all classes there were 33,780 crew, and 11,661 passengers.

At the lower inspection station at Port Eads, near the mouth of the Mississippi River, 202 steamers and 10 sailing vessels were inspected, carrying 6,691 crew and 779 passengers. The total of vessels inspected at the Mississippi River quarantines was, therefore, 1,219.

No quarantinable disease was treated at this station during the fiscal year.

On August 10, 1907, the Belgian steamship *Cameta* arrived from Java with a clean history except for 2 Chinamen reported to be suffering with "weakness and rheumatism." Upon inspection it was found that 6 Chinamen of the crew were suffering with beriberi; one of these cases died at this station while vessel was undergoing disinfection. The living quarters of the Chinese crew were washed down with bichloride of mercury solution, after fumigation with sulphur. As this disease is not quarantinable, the 5 cases were permitted to reembark when pratique was given.

On August 16, 1907, the Mexican steamship *Puebla* arrived from Tampico with a clean history. Previous ports had been Vera Cruz and Progreso. This vessel was held for fumigation. On the following day, August 17, a case of illness developed in one of the crew which terminated in death within six hours after onset of the illness. The case was one of malarial fever, algid form, choleraic type.

A number of persons (chiefly crew) were removed from vessels, on account of a rise in temperature, to the quarantine hospital for

observation. The following is a partial list of diseases treated during the fiscal year: Pneumonia, 2; malaria, 51; typhoid, 11; tuberculosis, 2; dysentery, 1; beriberi, 1; diseases of the digestive system, 54; temporary elevation of temperature, otherwise in good health, 9.

SUPPLEMENTAL INSPECTION SERVICE AT NEW ORLEANS.

On March 16, 1907, the bureau directed Surg. J. H. White at New Orleans to submit a plan of procedure necessary to keep all the personnel of vessels arriving at New Orleans from the Tropics under observation after having passed the quarantine.

A force was put in operation on March 20, and this force, consisting of two acting assistant surgeons, one lay inspector, and one acting stenographer, has been on duty since and has, although at times under great stress, accomplished the end the bureau had in mind, which was that all persons from all places which might possibly contain infection should be under observation until the incubative periods of yellow fever and plague were passed, it being well established that the unknown focus of these diseases is the most real danger to our quarantine system.

The transactions of the office thus established follow:

The table attached to and forming part of this report shows the number of vessels arriving at New Orleans from tropical ports, the total number of passengers, the number giving destinations in infectible territory, the number going to noninfectible territory, the number of crew, the number of persons kept under surveillance, the results of this surveillance, and the number of persons who have evaded inspection and observation.

In round numbers 30,000 sailors and 6,500 passengers arrived at New Orleans from points in the Tropics during the year. Of these, 33,600 persons were kept under surveillance, the majority of course being sailors, most of whom remain aboard their vessels. It was necessary to keep constant supervision over the 4,000 passengers who remained in infectible territory, and the 1,000 sailors who quit their ships, making it incumbent upon the inspectors to watch carefully the condition of health of these 5,000 persons who were likely at any time to change their locations, and who were to be considered as possible sources of infection, having come from points that might have been infected, although not known to be so.

Of these 5,000 persons who were to be kept under observation, all were successfully watched, except 28.

Of the number of persons reported as having evaded final inspection, there were a half dozen or more whose condition of health was, to all intents and purposes, known to be good by the inspectors, the persons having been seen on the streets or wharves by friends, but because the inspector himself did not see them, and could not certify to their good health, they were accounted for as lost.

PLAN OF PROCEDURE.

Each vessel is met by one of the acting assistant surgeons upon arrival, so that no delay be caused either vessel or passengers. The acting assistant surgeon takes the temperature of each passenger and gets from each his name and address, explaining briefly why this

is wanted. Temperature and other conditions being found satisfactory, the passenger is allowed to leave the vessel, first being given a slip to remind him that he will be kept under observation, or, if going north, a post card which he is asked to sign and mail upon the date already written or stamped on the card. This date is always that which completes the sixth day since the vessel touched at her last tropical port. This report card is valuable in that it determines definitely, as much as anything but personal inspection can, the fact that the passenger was in a certain vicinity on a certain day, the post mark on the card being a silent but important witness. These cards dispel any suspicion that perhaps the passenger changed his mind after leaving the ship and remained in New Orleans or in some other spot in the infectible zone.

Within the shortest possible time after the arrival of the vessel, and allowing only time for the passengers to locate themselves, efforts are made to verify the addresses given. Hotel registers are watched for such as might have decided to remain after announcing their intention to leave at once. Addresses given for points in New Orleans are visited, and if any passenger is found to have given an incorrect address, special endeavors are made at once to learn where he went. Often baggagemen and cabmen are called upon for aid in the search, and in almost every instance the passenger has been found before the expiration of the period of incubation.

Passengers destined for infectible points—outside of New Orleans—are classed by themselves, and letters are forwarded to the health authorities of those places, the service officers in Mobile and Pensacola being notified when persons are destined for those cities. Passengers destined for noninfectible points are not kept under observation, this not being necessary, except that it is essential to know that they actually went to the destinations given without loss of time, and that they did not remain in infectible territory. Many persons did remain in infectible territory a few days, long enough for their incubative periods to expire, and in each case these persons were kept under observation and finally inspected in New Orleans or at other points.

The various railroads furnish the service with lists of passengers forwarded by their routes and give the destinations of the persons, which again is good circumstantial evidence of where the passenger went in each case, and this aid has been exceedingly valuable.

Valuable cooperation has been received from the health authorities of Tennessee, Texas, Mississippi, Louisiana, and New Orleans. Reports received from them of final inspections of personnel going into their jurisdiction form part of the records.

The New Orleans sanitary inspection office has also kept under observation and made final inspection of about 100 passengers who arrived from tropical ports via Mobile, going thence to New Orleans.

As soon as a ship report reaches the office, all data are entered in a card-index system by means of which any clue can be followed up, while the signed reports from the quarantine officer and ship surgeons are filed away permanently.

Incidentally, it may be well to state that at the suggestion of Surgeon White the United Fruit Company is carrying surgeons on most of their larger vessels, and those physicians make a daily report of temperatures on the voyage.

The card-index system is so arranged that in a moment information relative to any passenger who has arrived since April 1, 1907, can be had, where he is from, what vessel brought him here, when he arrived, his state of health on arrival and for some days thereafter, where he located, what house he occupied, and what persons kept him under observation and made the inspections.

TRANSACTIONS AT NEW ORLEANS SANITARY INSPECTION OFFICE, YEAR ENDING
JUNE 30, 1908.

Month.	Number of vessels.	Number of crew.	Number of passengers.	Number of crew discharged.	Number of passengers to New Orleans via other ports.	Total number persons inspected on arrival.	Total number passengers at New Orleans giving destination in infectible territory.	Total number passengers at New Orleans giving destination in noninfectible territory.	Total number persons kept under surveillance.	Total number passengers kept under surveillance.	Number passengers destined for noninfectible points finally passed in New Orleans.	Number cases illness reported aboard vessels.	Total number of persons not seen for final inspection.
1907.													
July	90	2,772	408	114	8	3,188	232	176	3,028	264	24	20	4
August	82	2,449	406	116	16	2,871	265	141	2,748	315	34	32	8
September	79	2,256	561	66	16	2,833	313	248	2,654	414	85	26	4
October	88	2,649	409	118	11	3,069	245	164	2,950	312	56	20	2
November	83	2,637	416	94	1	3,054	296	120	2,968	332	35	24	0
December	81	2,911	473	67	4	3,388	297	176	3,248	341	40	6	0
1908.													
January	64	2,212	523	34	0	2,735	297	226	2,546	334	37	8	0
February	68	2,407	838	77	3	3,248	339	499	2,828	424	82	4	0
March	72	2,484	701	69	17	3,202	318	383	2,838	371	36	3	0
April	67	2,151	712	120	11	2,874	370	342	2,539	399	18	12	3
May	76	2,373	551	29	7	2,931	246	305	2,641	275	22	5	5
June	77	2,260	557	57	3	2,820	295	262	2,618	358	60	11	2
Total	927	29,561	6,555	961	97	36,213	3,513	3,042	33,603	4,139	529	171	28

San Diego, Cal., quarantine.—Acting Asst. Surg. W. W. McKay in charge.

One hundred and forty-one vessels were spoken and passed; 200 steamers and 15 sailing vessels were inspected and passed, and 3 steamers were fumigated for the destruction of either mosquitoes or rats. - These vessels carried crews of 8,534 and 5,457 passengers.

The 141 vessels spoken and passed were either navy vessels from Magdalena Bay, Mexico, where they had gone for target practice, or coastwise (California coast) vessels that had been fumigated to kill rats at San Francisco.

San Francisco quarantine.—Post-office and telegraphic address, Angel Island, Cal. Passed Asst. Surg. W. C. Hobdy in command.

Twelve vessels were inspected and passed, and 105 vessels were boarded and passed; 445 steamers were inspected and passed, and 21 steamers were disinfected; 264 sailing vessels were inspected and passed and 3 were disinfected. These vessels carried a total of 60,097 crew and 46,917 passengers. Of these vessels 288 were from plague and cholera-infected ports.

The number of vessels "boarded and passed" was due to the number of naval vessels entering the port.

Two items may be noted in the work of this station. They are (1) the amount of work done on cargo held (9,301 packages), all of which was inspected (taking over 50 trips of the boarding boat) and much of which was disinfected or stored at the station; (2) the other item, the medical boards of special medical inquiry, 46 in number, which made inquiry into the cases of 490 aliens on appeal.

The relations between the service here and other federal services and with the representatives of this service in other ports continues to be amicable and harmonious.

The most noteworthy incident of the year has been the detention of two coasting steamers on account of smallpox. These vessels carry no physician, and in the absence of professional authority the patients were allowed to roam at will. In each case contacts developed the disease during the period of detention at the station.

Port Townsend, Wash., quarantine, and subports.—Passed Asst. Surg. J. H. Oakley in command.

During the fiscal year ending June 30, 1908, 793 vessels were boarded; of these, 539 were steamers, the remaining 254 being sailing vessels.

Of the total number of vessels boarded, 728 were inspected and passed, and 44 steamers and 21 sailing were detained for disinfection in whole or in part as the circumstances demanded.

The 793 vessels carried a total of 39,099 passengers, and their crews numbered 39,971.

Five cases of smallpox were treated at the station during the year. All the cases recovered.

The revenue cutters *Thetis* and *Arcata* were fumigated for destruction of rats.

The U. S. S. *Kentucky* was at the station for fumigation of crew's quarters, from which a case of smallpox had been removed at the Puget Sound Navy-Yard.

At the subport of Port Angeles, Wash., 2 steamers and 10 sailing vessels carrying 6 passengers, and with 251 men in their crews, were inspected and passed during the year.

At the subport of South Bend, Wash., 100 steamers were inspected and passed, 8 steamers were detained for fumigation; 14 sailing vessels were inspected and passed, and 3 detained for fumigation during the year. These 125 vessels carried 37 passengers, and their crews were made up of 2,289 persons. The 125 vessels were from San Francisco.

Columbia River, Oreg., quarantine, and subports.—Post-office and telegraphic address, Astoria, Oreg. Passed Asst. Surg. J. M. Holt in command.

During the year 40 steamers and 151 sailing vessels were inspected and passed. These vessels carried 15,589 crew, and 9,024 passengers. There were no cases of quarantinable disease at the station.

Coos Bay quarantine (substation).—Post-office and telegraphic address, North Bend, Oreg. Sixty-six steamers and 12 sailing vessels, with 78 crew and 38 passengers, were inspected and passed.

Siuslaw and Umpqua River quarantine (subport).—Twenty sailing vessels with 146 crew were inspected and passed during the year.

Yaquina Bay quarantine (substation).—No transactions during the year.

Grays Harbor quarantine (substation).—Two hundred and seventy-nine steamers and 115 sailing vessels, with 1,642 passengers and 7,104 crew, were inspected and passed during the year.

TEXAS-MEXICAN BORDER INSPECTION.

El Paso, Tex.—Acting Asst. Surg. E. Alexander reports that during the year 17,204 passengers were inspected. There were 181 vaccinations and 41 fumigations of hides and bones; 101 nonimmunes from Tampico and Vera Cruz were held under observation to complete the period of five days from port of departure.

Laredo, Tex.—Acting Asst. Surg. H. J. Hamilton reports that during the year 760 passenger trains, carrying 46,155 persons, were inspected; 1 case of smallpox and 11 suspects were detained, and 612 persons were vaccinated. Four pieces of baggage were disinfected.

Eagle Pass, Tex.—Acting Asst. Surg. Lea Hume reports that for the year 376 trains, carrying 14,800 passengers, were inspected. One case of smallpox was discovered and returned to Mexico.

INSULAR QUARANTINE.

OPERATIONS OF THE SERVICE IN THE PHILIPPINE ISLANDS.

Passed Asst. Surg. Victor G. Heiser, chief quarantine officer for the Philippines, has made a full report on the quarantine transactions for the fiscal year ending June 30, 1908, from which the following information is abstracted. In addition to his detail as chief quarantine officer, Doctor Heiser has also been appointed commissioner of health by the insular government.

So far as known, no quarantinable disease was introduced into the Philippines during the year. The efficacy of modern quarantine measures as applied under the provisions of the United States Quarantine Laws and Regulations, not only in preventing the introduction of dangerous communicable diseases, but at the same time causing very slight delay and interference with the shipping interests, was perhaps best shown by preventing the reintroduction of plague into the Philippine Islands, in spite of the fact that this disease occurred in epidemic form in China, which is within a few days' sailing distance of Manila, and vessels arrive from there almost daily. In addition to the foregoing, the disease was present in India, the Straits Settlements, Indo-China, Japan, and Australia, all of which are countries that are in direct communication with the Philippines. The strict measures which are insisted upon at the port of departure have, no doubt, contributed largely to this successful issue.

Although cholera was present at times in almost epidemic form in Manila, the measures taken with outgoing interisland vessels were entirely successful in preventing the introduction of the disease into other islands, with one exception; and in this instance the disease was probably carried to the sparsely inhabited island of Mindoro in some foodstuffs that were surreptitiously taken aboard after the quarantine inspection was completed.

Results of this kind show that, even though the work is done in the heart of the Orient, amidst the most unfavorable surroundings, yet they could have been no more successful under the most favorable conditions.

Personnel.—Passed Asst. Surg. Victor G. Heiser, chief quarantine officer for the Philippine Islands. Manila: Passed Asst. Surg. T. B. McClintic, Passed Asst. Surg. Allan J. McLaughlin, Pharmacist and Cashier N. C. Comfort. Mariveles: Asst. Surg. Frank H. McKeon. Iloilo: Asst. Surg. Joseph Pettyjohn. Cebu: Passed Asst. Surg. R. E. Ebersole. Zamboanga: Acting Asst. Surg. H. H. Johnson. Jolo: Acting Asst. Surg. H. D. Snyder. Cavite: Acting Asst. Surg. D. N. Carpenter. Olongapo: Acting Asst. Surg. C. P. Kindleberger. Total personnel, including employees, 83.

Cholera.—Studies made of this subject during the past year by Passed Asst. Surg. Heiser and presented in the form of a paper be-

fore the fifth annual meeting of the Philippine Islands Medical Association, entitled "Some considerations with regard to the cause of the frequent reappearance of cholera in the Philippine Islands," and later published in the April number of the Philippine Journal of Science, have thrown considerable light upon the manner of the spread of this disease. It appears probable that cholera has become endemic in the city of Manila, and that relief can only be hoped for when the new extensive water and sewer system, which is now nearing completion, is in complete use.

The service has again rendered valuable aid in preventing the introduction of this rapidly spreading and fatal disease from Manila to the other islands of the archipelago. The great number of lives that have been saved on this account alone is simply inestimable, and in striking contrast to the conditions that prevailed prior to American occupation.

Plague.—Not one case of plague in human beings or in rats is known to have occurred. Rats were obtained at weekly intervals from localities in which plague occurred in former years, but no infection was detected among them. One case suspicious of plague was reported by the chief surgeon of the Philippine Division of the United States Army as having occurred in a soldier stationed at San Mateo, Rizal Province. The bureau of science made a most careful investigation of this case, but the smear preparations and cultures made showed conclusively that the disease was not plague.

The steamer *Ferd Laeisz* arrived here from Hankow, China, which is about 300 miles inland on the Yangste Kiang River, via Hongkong, with a cargo of hay, with one of the crew suffering with symptoms resembling those of plague. The man, who was said to have been shipped at the port of Hongkong, was promptly transferred to the San Lazaro plague hospital, where a definite diagnosis of plague, based upon laboratory findings, was made. The vessel was sent to the Mariveles Quarantine Station, and the measures required by the quarantine regulations were rigorously carried out, after which the vessel was detained for seven days. No further cases occurred.

Rat-proof wharves.—The extensive harbor improvements in Manila, which are now nearing completion, include the first wharves suitable for deep-seagoing vessels that have been constructed in the Orient. It was soon recognized that these wharves present a distinct sanitary menace to the islands, in that they will afford much easier means for rats to reach the shore. When it is remembered that very many of the vessels that will come alongside are from badly infected plague ports, it may readily be seen that the service is confronted with a most difficult problem, upon the successful solution of which will largely depend the prevention of the introduction of plague in the future.

In order to meet this difficulty, the engineer in charge has arranged to connect the main wharf with the shore by a bridge, part of which can be lifted at night and at other times when not in use, so as to prevent the escape of rats to the shore. The structure beneath the floor of the wharves is also built smooth, so that rats can not gain a footing. Vessels of this kind will also be frequently fumigated in order to reduce the rats to the smallest possible number.

Smallpox.—The terrible epidemics of smallpox which occurred in some of the nearby foreign countries, and more especially in the

seaports of Japan, were responsible for no less than two vessels arriving at Manila and three at Cebu with this disease aboard. After thorough vaccination and rigid disinfection no further cases of this disease occurred.

The vaccination of the crews of the interisland vessels which has been so frequently carried out during the past five years is, no doubt, responsible for the fact that no case of this disease occurred in these vessels during the year. Over a million persons were vaccinated by the bureau of health during the past year, but all the residents have not as yet been reached, and this, coupled with the fact that many sections of the islands are so remote that it is almost impossible to deliver vaccine to such regions that is in potent condition, makes it likely that a number of years must yet elapse before the disappearance of this disease can be hoped for. In spite of this, however, it can be truthfully said that in the place of hundreds there are now only dozens of cases occurring, and when it is remembered that the country is literally saturated with the infection of smallpox it may be seen that the conditions now present a favorable contrast to those which existed a few years ago.

Leprosy.—As the work of the insular government to segregate all lepers in the Philippines at the Culion leper colony nears completion, the quarantine inspections of interisland commercial vessels reveal less and less of these unfortunates. The service has, however, come into direct contact with this question by disinfecting the government vessels which have been employed in transferring the lepers to Culion. These disinfections have been most thoroughly carried out, and are done upon the principle that the infection may be transmitted by direct contact with portions of the vessel, or articles, or textiles which have been touched by the lepers, or that the leper bacillus may be conveyed by vermin. For this latter purpose sulphur is used.

Vessels boarded.—There were 6,111 incoming vessels boarded and inspected at the ports of entry. At Manila there were 3,096; at Iloilo, 993; at Cebu, 1,833; and at the other ports, 189.

Vessels disinfected.—Sixty-six vessels were disinfected, 62 at Manila, 1 at Zamboanga, and 3 at Cebu. Five vessels were disinfected on account of smallpox, 1 on account of cholera, 1 on account of plague, 8 on account of being employed in transporting lepers, and the remainder because they came from infected ports, or were proceeding to the United States.

Fumigation of vessels.—Fumigation once in every six months of all vessels engaged in the interisland trade has been continued. Vessels from Saigon in the rice and cattle trade and vessels from the China coast are also frequently fumigated. There were fumigated 99 vessels at Manila, 46 at Iloilo, 17 at Cebu.

Cargo.—Similar regulations to those previously enforced were in effect during the year.

Outgoing quarantine.—Consular bills of health were issued to 104 vessels. Of these vessels 20 were partially disinfected and 10 were fumigated throughout. Of the army transports bound from the Philippines to the United States 12 were partially disinfected and their crews and steerage passengers bathed and their effects and baggage disinfected. During the year 43,350 pieces of baggage were dis-

infected; 44,763 pieces passed after inspection, 414,586 pieces of cargo were investigated and passed, and 2,117 pieces disinfected.

Restrictions modified.—As the health conditions in the Philippines have been improving from year to year, it has been possible gradually to reduce the quarantine restrictions which were imposed upon vessels at the outset. During the last month of the year, vessels arriving at one port in the Philippine Islands from another port in the Philippine Islands that was not infected were exempted from awaiting inspection prior to their discharging passengers, cargo, or crew, provided the master of such a vessel would certify that no case of sickness had appeared aboard within five days of the time of his arrival, and that his vessel was in a sanitary condition. An inspection, however, is made of each vessel as soon as it reaches the wharf in order to determine whether the data furnished is correct. While this change has greatly facilitated business, yet the amount of work performed by the service has not been essentially lessened.

Smaller ports of entry.—A recent law which becomes effective July 1, 1908, has created Davao, a port situated on the east side of the island of Mindanao, a port of entry. Although but very few freight vessels will probably make this a port of call, yet Davao is situated upon one of the largest islands of the archipelago, and is in direct connection with many of the principal trade routes, so that there would be considerable opportunity for the spread of quarantinable disease if it was once introduced.

It is also most desirable to have the quarantine inspection at ports of entry uniform, otherwise it might offer a favorable opportunity to introduce prohibited cargo and evasions of the immigration law.

Negotiations are now under way with the view to having a medical officer of the constabulary act as quarantine officer at this port.

The arrangement entered into some years ago to have medical officers of the army or navy act as quarantine officers at the smaller ports has continued to give excellent satisfaction, and has done much to facilitate commerce.

Maintenance of buildings and equipment.—The rapid deterioration of buildings, wharves, vessels, etc., that takes place in the Tropics can scarcely be appreciated by those who have not had actual experience with these conditions. The ravages of the teredo cause the complete destruction of piles of the hardest woods within three years, the dry rot destroys ordinary planking in about two years, and the white ants, within a comparatively short time, may cause the destruction of entire buildings.

Owing to the limited amount of expert assistance available, and the great distance of the islands from the United States, the quarantine officer is left with many technical problems to solve for which his medical training probably did not fit him, and which properly belong to other branches of the Government, but, confronted by the stern necessity of the situation, it is very much to his credit that he has not only met them, but met them successfully. The condition of the property under the control of the service in the Philippines compares favorably with that of any other branch of the Government, and the cost of maintaining it has been most reasonable.

During the coming year, the replacing of the 400 feet of wharf of the Mariveles quarantine station with heavily impregnated creosote

soted timber will be nearly completed, after which this structure should last for many years.

The creosoted timber wharf at the Cebu quarantine station has now been in place for more than three years, and as yet shows no signs of deterioration. Considerable labor and material, however, will be required both at Mariveles and Cebu to keep the station buildings in good condition.

The disinfecting barge *Protección* was temporarily transferred to the bureau of health for use at the Culion leper colony, which will relieve the service for a time at least of its maintenance.

New disinfecting process.—In the report recently issued by the Japanese quarantine authorities, it is stated that considerable success has been had by generating formaldehyde by the ordinary potassium method, in a tight room into which steam is admitted in limited quantities. Owing to the large number of hats, shoes, belts, knapsacks, camp equipment, and many other things which are likely to be infected, but which are injured by the steam-disinfecting process, a method of this kind, if reliable, would be of inestimable help in carrying out the quarantine work in the Philippine Islands. With this end in view, at the close of the year, a room for this purpose is actually in process of construction, and it is hoped that full results may be available for next year's report.

Dysentery contracted aboard ships.—The service has been able to render excellent aid during the year in combating dysentery which, no doubt, many persons have contracted while traveling upon inter-island vessels. Many of the ships' water tanks had become thoroughly infected with amœba. In order to correct this condition, a number of years ago a propaganda was started, which has been persistently fostered, with the view of having all interisland vessels install aboard a distilling apparatus, in order that sterile drinking water could be furnished. These are now gradually being introduced, and the good results are already apparent. In the meantime vessels are sent to the Mariveles quarantine station, where the tanks are thoroughly cleansed and disinfected with permanganate of potassium.

Purchase of supplies.—The selecting and purchase of supplies of the service to the amount of \$18,768.45 was done during the year. In view of the fact that the Philippines are almost 10,000 miles away from a good market this becomes not an inconsiderable part of the duties of the officer in charge. Considerable foresight must be exercised in ordering supplies fully a year in advance of the time that they are needed.

Aid to other services.—1. Board of marine examiners. The service conducted the physical examinations of applicants for license as masters, mates, and engineers on vessels registered in the Philippine Islands. The local law requires a full physical examination, such as given cadets and officers in the Revenue-Cutter Service. During the year 198 examinations were made, 166 were passed, and 32 were rejected.

2. Immigration. At the ports of entry of the Philippine Islands the service officers inspected during the year 7,856 aliens and certified 51 as being afflicted with excludable diseases or conditions which

would affect their ability to earn a living. Of the number certified 37 were deported, 1 escaped, 4 were subsequently landed, and 9 remain awaiting decisions of appeals or deportation.

3. Bureau of health. For the bureau of health hides, animal food products, etc., were inspected and certified for landing or shipment; ships, launches, and lighters in port were disinfected to prevent the spread of disease; and water transportation was supplied to carry out sanitary measures on river and bay. Nine vessels were disinfected on account of having carried lepers to the Culion Leper Colony.

4. Bureau of education. A number of students bound for the United States, at either government or private expense, were given a rigid physical examination at the request of the director of education.

5. Bureau of navigation. Physical examinations of officers and men were made to determine their fitness for promotion or for positions in the coast-guard service. Cutters and launches were disinfected and fumigated and crews vaccinated.

6. Coast and geodetic survey. Physical examinations were made of employees of that service.

7. Bureau of posts. The post-office officials were given every aid possible, both at Manila and Mariveles, during the outgoing quarantine; large quantities of mail were handled daily by service employees in order to insure prompt dispatch.

8. Light-house service. A light was maintained on Mariveles Bay, supplies being furnished by the light-house establishment and the service superintending the care and maintenance of the light.

9. Bureau of civil service. Special physical examinations were made of civil employees or applicants for eligibility when so requested by the director of civil service. A number of examination papers were examined and rated.

10. Weather bureau. The service displayed storm signals on Mariveles Bay for the weather bureau in accordance with advices received by wire from the director of the bureau. These signals at Mariveles have been a great aid to vessels and are highly appreciated by the shipping interests.

11. United States Army. A number of transports were disinfected upon request on account of measles or other communicable diseases occurring aboard. All were fumigated during the year to exterminate vermin. Launches and lighters were fumigated. Quarters at Mariveles were provided for over 4,000 United States soldiers for periods of from five to fifteen days while awaiting the sailing of the transports bound for the United States.

12. Bureau of agriculture. Vessels which had carried diseased cattle were disinfected at the request of the director of agriculture.

Immigration.—Immigration to the Philippine Islands since the Russo-Japanese war has shown no particular tendency to increase. The rejections on account of disease were practically the same as last year.

Owing to the medical provisions of the United States immigration laws being made applicable to Chinese persons beginning January 1, 1907, an anomalous condition of affairs was produced. At the time the law went into effect, 5,000 or more Chinese persons who

had been residents of the Philippine Islands, many of them for thirty years or more, were absent on a visit to China. When they attempted to return here, great numbers of them were advised not to embark on account of the fact that they were afflicted with trachoma and other diseases which come under the provisions of the immigration laws. Many of the Chinese felt that they had not been given sufficient warning that trachoma, for instance, would prevent them from returning to the islands, and many claimed that if they had known this they would not have left the islands at all, and that it was a great hardship to be deprived of returning to their families, to their property, and also, what, in many instances, they regarded as their homes. The Chinese from the Amoy district were particularly affected, and as persons who had been advised not to embark gradually increased in numbers in and about Amoy, the dissatisfaction naturally increased, and considerable resentment was shown against the United States. During the month of March, it was estimated that over 3,000 such persons had accumulated at Amoy alone. These facts were brought to the attention of the Insular Government, and, upon the request of the Governor-General of the Philippine Islands, Passed Asst. Surg. Victor G. Heiser proceeded to Amoy March 28, 1908, for the purpose of ascertaining whether some of the large number of aliens who were refused passage on account of trachoma, could not be admitted into the Philippine Islands. Upon investigation it was found that many of them were afflicted with an eye affection which resembled trachoma, but in which a definite diagnosis could not be made until they had either been under medical treatment, or prolonged observation. This period had expired for a great many persons, and others in the meantime had undergone successful treatment, and on that account he was able to recommend for passage a large number of persons who had heretofore been refused transportation. This action did much to restore confidence and relieve, temporarily, at least, a very acute condition.

At Amoy it was learned that it has been customary in the past for American consuls to appoint a so-called consular surgeon, to whom, in some cases, a definite salary was paid by the consul, the consulate then collecting from each alien who desired to go to the Philippine Islands, or other American territory, a fee, the total of which is said to have amounted to large sums. This collection of fees produced considerable criticism, and cast serious reflection upon American methods in the Orient. At the present time a private physician makes the medical examination, and a fee is paid to him direct by the alien who desires to embark. In view of the suspicion with which the medical examination as at present conducted in Amoy is regarded, the question of detailing a regular service medical officer for such duty at Amoy has been receiving consideration. In addition to the appointment of such officer from a purely immigration standpoint, it also would have additional advantages, because Amoy is one of the great plague centers of the world, and if cargo, passengers, and baggage could be properly supervised before shipment to the United

States, or its territories, the quarantine restrictions which are at present imposed could, no doubt, be greatly modified.

Summary of quarantine transactions, both incoming and outgoing, for the Philippine Islands, fiscal year ended June 30, 1908.

	Manila.	Iloilo.	Cebu.	Cavite.	Olongapo.	Zamboanga.	Jolo.	Total.
Vessels inspected.....	4,763	993	1,833	19	3	126	41	7,778
Vessels detained in quarantine.....	173	8	3					184
Vessels disinfected.....	62		3			1		66
Vessels fumigated to kill vermin.....	99	46	17					162
Bills of health issued...	2,696	109	137	19				2,961
Pieces of baggage disinfected.....	37,692	2,303	658					40,653
Pieces of baggage inspected and passed...	44,740	1,406	23					46,169
Pieces of miscellaneous cargo certified.....	214,586	81,579	118,421					414,586
Cases of quarantinable diseases detected on vessels.....	3		6			3		12
Persons detained in quarantine.....	8,439	217	236			5		8,997
Crew inspected.....	164,860	25,899	50,699	6,141	408	7,530	1,571	257,108
Passengers inspected...	111,657	11,169	19,767	4	140	3,651	641	147,029
Persons vaccinated.....	1,993	30	122					2,145
Persons bathed and effects disinfected.....	17,725		236					17,961

FINANCIAL STATEMENT.

A.—General appropriation, Bureau of Quarantine Service.

Balance, former fiscal year appropriations.....	\$18,645.050
Appropriation, act 1679, fiscal year 1908.....	64,000.000
Collections available for expenditure.....	2,300.505

Total available..... 84,945.555

Expended during the fiscal year 1908.....	56,737.445
Unexpended balance, June 30, 1908.....	28,208.110

Total 84,945.555

Outstanding liabilities (estimated), \$25,000.

B.—Appropriation for public works and permanent improvements.

Balance appropriation, act 1342.....	\$789.630
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Expended during fiscal year 1908.....	.000
Unexpended balance.....	789.630

Total 789.630

Outstanding liabilities (estimated), \$225.

Expenditures, details.

Compensation of personnel.....	\$34,881.375
Office and general service expenses.....	1,688.525
Launch and barge expenses.....	5,842.470
Station supplies and disinfectants.....	6,373.130
Repairs to buildings and wharfs.....	7,208.200
New construction and new equipment.....	743.745

Total expenditures, United States currency..... 56,737.445

Expenditures by station.

Manila :	
General service expenses-----	\$13, 091. 435
Launch expenses-----	6, 334. 705
New station equipment-----	63, 865
	<hr/>
	19, 490. 005
	<hr/>
Mariveles :	
General service expenses and supplies-----	14, 225. 100
Repairs to buildings and wharfs-----	7, 135. 265
New construction and equipment-----	695. 975
	<hr/>
	22, 056. 340
	<hr/>
Iloilo :	
General service expenses-----	2, 885. 715
Launch and barge expenses-----	3, 602. 730
New station equipment-----	000
	<hr/>
	6, 488. 445
	<hr/>
Cebu :	
General service expenses-----	4, 541. 080
Launch expenses-----	3, 245. 995
Repairs to buildings, wharf, and reservation-----	124. 985
New construction and new equipment-----	595
	<hr/>
	7, 912. 655
	<hr/>
Jolo :	
General service expenses-----	380. 000
Zamboanga :	
General service expenses-----	410. 000
	<hr/>
Total expenditures-----	56, 737. 445

OPERATIONS OF THE SERVICE IN HAWAII.

This service continues to exercise many important functions in the Territory of Hawaii. The work there is increasing in extent and importance with the development of that country. Nor is the benefit derived confined to Hawaii; the mainland, particularly the Pacific coast ports, receiving through the service organization there, protection from quarantinable disease possible only where quarantine measures are carried out at a place so situated geographically.

The work done by the service in Hawaii is fully described in the report of the chief quarantine officer, Passed Asst. Surg. L. E. Cofer, from which the following facts are abstracted: In addition to his duties as chief quarantine officer, Doctor Cofer, with the consent of the department, has served for several months as president of the board of health of the Territory of Hawaii under appointment by the governor.

The operations of the service may be described under three heads: First. Quarantine operations; second, medical care and treatment of seamen; third, medical inspection of immigrants.

QUARANTINE OPERATIONS.

Quarantine operations are further divided into, first, incoming quarantine; second, outgoing quarantine.

Under the first heading is included the protection of the port from disease brought in by vessels from foreign or domestic ports.

The second heading comprises the work done in prevention of the spread of disease from the port of departure to other ports.

The following table shows the incoming quarantine transactions at Honolulu for the fiscal year ended June 30, 1908:

INCOMING TRANSACTIONS AT HONOLULU NATIONAL QUARANTINE STATION, FISCAL YEAR ENDED JUNE 30, 1908.

Month.	Steam vessels inspected.			Sailing vessels inspected.		
	Num-ber.	Crew.	Passen-gers.	Num-ber.	Crew.	Passen-gers.
1907.						
July	27	4,017	6,663	5	74	5
August	28	3,439	3,674	7	95	15
September	23	6,184	5,349	8	128	1
October	23	3,516	5,905	8	132	10
November	13	1,426	1,888	4	63	5
December	23	2,987	6,688	7	111	11
1908.						
January	21	1,566	2,844	18	180	8
February	23	1,060	5,124	8	158	3
March	26	3,388	6,088	10	139	8
April	21	2,407	3,676	12	229	10
May	24	3,684	4,684	12	175	8
June	23	3,280	3,846	5	114	6
Total	275	36,964	56,429	104	1,598	90

The following table shows the outgoing quarantine transactions at Honolulu for the fiscal year ended June 30, 1908.

Outgoing quarantine was in force at the beginning of the fiscal year, July 1, 1907, and was raised as to the disinfection of the personnel of ships on September 10, 1907. Rat precautions have been kept continuously in force.

Outgoing quarantine for Asiatic cholera was imposed on December 22, 1907, and raised on January 19, 1908.

Transactions, outgoing quarantine, Honolulu.

Vessels inspected and bills of health issued	58
Vessels disinfected and bills of health issued	17
Cabin passengers inspected	1,052
Steerage passengers inspected	454
Crew inspected	1,117
Steerage baggage disinfected	pieces 429
Baggage for crew disinfected	do 764
Freight disinfected	do 65
Declined certification on account of fever	2

General transactions at the Honolulu quarantine station during the fiscal year ended June 30, 1908.

Orientals detained in quarantine for observation	2,615
Europeans detained in quarantine for observation	80
Baggage disinfected	pieces 3,465
Days the station has been in quarantine	45
Persons vaccinated	1,324
Persons treated in hospital with quarantinable diseases	6
Vessels fumigated with SO ₂	31
Autopsy	1
Cremations	7
Number of days treatment in hospital of persons suffering from quarantinable diseases	124
Number of deaths on the station	1

A DESCRIPTION OF THE QUARANTINE EQUIPMENT AT HONOLULU, TOGETHER WITH GENERAL METHODS OF HANDLING INFECTED VESSELS AND THEIR PASSENGERS AND CREWS.

Wharf.—The quarantine wharf at Honolulu is a solidly built structure 310 feet long by 80 feet wide. It is erected on cylindrical concrete piers 3 feet in diameter. At the north end of the wharf a slip is provided for the quarantine launch *Oahu*, and also the boat landings. On the west side of the slip is a large storeroom and workshop. On the east side is a small two-story building, with an office for the pilot and engineer and dormitories for the fireman and deck hand below.

At the southern extremity of the wharf, on a structure 20 feet high, are three large tanks. One of these is for fresh water, the supply being piped from the island; one is for salt water for supplying the baths, and one is for a mercury bichloride solution.

A pipe from this tank leads entirely along the front of the wharf, with suitable connections at frequent intervals, to which ordinary garden hose in any lengths necessary can be attached.

A well-built shed, 60 feet wide by 150 feet long, covers the remainder of the wharf. This shed is entirely inclosed and has an iron roof. Its interior is divided off by suitable partitions, 10 feet high, into rooms for the disinfecting plant, dressing rooms, receiving room, detention and bathroom. The disinfecting plant is situated in the center of the shed, the steam chambers, five in number, being arranged in a line across from east to west. A partition is built across the shed over the chambers, dividing this department into an "infected" and "disinfected" side. The five disinfecting chambers are equipped with formaldehyde gas generators. Two boilers supply the necessary steam. A third boiler could supply steam for the engine of an electric dynamo. These three boilers are erected "in battery," so that any one, any two, or all three, can be used at a time, thus practically eliminating the stoppage of work through the temporary breaking down of a boiler. Storage for 10 tons of coal is provided for on the wharf.

On two platforms, 10 feet high, against the east wall of the shed, are erected four sulphur furnaces; two furnaces and one engine and fan to each platform. These furnaces are connected together by large galvanized iron pipes in such a way that the two on one platform can be used together, or all four at the same time, if necessary. The connecting pipe at intervals of 25 feet passes through the wall, where hose connections are provided for 6-inch sulphur hose pipe for leading down into the holds of vessels. Because there is no 6-inch sulphur pipe on hand at present at the station, sulphur pots and pans are now being used. Under the water tanks provision has been made for the storage of 20 tons of sulphur.

The bathroom is divided into three parts—the receiving side, the bath proper, and the drying side. Salt water is used entirely for bathing purposes and is here ideal for the purpose, because it is not only mildly antiseptic, but in this climate its temperature is never below 65° F. and, in fact, is always warmer than tap water. Where oriental steerage passengers are to be handled, the use of individual showers for bathing purposes has been found to be impracticable. Not considering the cost of providing individual showers and the large amount of space necessary, it is difficult to insure the

actual bathing of each person. The chief offenders in this respect are the Chinese and Hindoos, who will come out of the bath without having allowed a drop of water to touch their bodies. Consequently this bath has been arranged on a different plan. The bath proper is arranged down the center of the room from one end to the other. There are two parallel chutes V-shaped, communicating at the upper end, thus forming the letter U. This chute is zinc lined and has drain openings through the wharf floor. A gate on one leg of the U gives entrance and another gate at the end of the other leg gives exit, so that the only communication from one side of the room to the other is through the bath chute. Overhead a 3-inch pipe is tapped for 32 showers, this pipe corresponding in shape to the bath chute. The chute is 4 feet 6 inches high, and on either side, at 4 feet from the floor, are fastened 1½-inch pipes which are pierced at 6-inch intervals for a lateral spray. All of this piping is controlled by one 3-inch valve. This bath will accommodate 32 persons at a time, all of whom are directly under the eyes of the attendants. The spray insures a thorough washing of each person. When in use the spray is turned on and off to allow each man to soap himself with salt-water soap. Then the water is again turned on to wash the soap off. The passengers are then let out on the other side of the bath chute and a new lot turned in. In this manner five minutes is sufficient for each lot. Three hundred and eighty-four persons can be bathed every hour by the method just described.

METHODS ADOPTED IN THE TREATMENT OF VESSELS AT THE QUARANTINE WHARF.

All steerage passengers are at once taken into a large receiving room with their baggage. The men are then separated from the women and children and their baggage taken into the disinfecting room for subsequent treatment. The men are then taken into the undressing room. Here each man receives a numbered sack and a tag with a corresponding number. The attendants see that each man takes off all of his clothes, which he puts in the sack and ties up, hanging the tag around his neck. These sacks are then thrown through an opening in the wall into the disinfecting room, where they are collected by attendants and placed in the steam chambers. The men are then counted into the bathroom, 32 at a time, and passed through the bath as described above. On coming out on the other side, each one is handed a towel and a kimono. On drying himself, he is passed around by an outside passage to a waiting room. His clothing, in the meantime, has remained in the steam chamber at a temperature of 240° F. for half an hour. The cars are then brought out on the "clean" side of the disinfecting room, the sacks containing the clothes are thrown through an opening in the wall into the waiting room, where each man picks out the numbered sack corresponding to his tag. Everyone on passing through this routine is held in this room until all are finished, when they are drafted up to the station proper and placed in their detention quarters. After the disinfection of the men has been completed, the medical inspectress takes charge of the women and puts them through the same process. All umbrellas, hats, shoes, and such articles, which can not be passed through the steam chambers without injury, are treated separately with formaldehyde gas. The ship's crew with

their baggage and clothing are then treated in the same manner. The pots are then set for fumigating the vessel with sulphur, and the decks washed down with "bichloride" solution.

After the completion of the disinfection of all the personnel, the attendants handle the steerage baggage, passing it through the steam chambers in the same manner as had been done previously with the body clothing.

Station proper.—The wharf is situated at the edge of the reef at deep water on the Honolulu harbor line, and is connected with the island by a runway 8 feet wide. This "runway" is built on concrete piers, and is half a mile long and is supplied with a 30-inch gauge track and 6 cars.

Quarantine Island, containing almost 40 acres, is all made land. It is roughly oval in shape, and is surrounded entirely by a reenforced concrete retaining wall 3 feet high. The land is graded from 3 feet in depth at the wall to about 6 feet in depth along the central ridge. Although scarcely two years have elapsed since the place was filled in with salt water and soil by means of a hydraulic dredge, the roads have all been laid out and graded, the surface of the island properly graded, and hundreds of trees and several acres of grass planted.

There are 39 separate buildings on the island. Among these the most important are the executive building, with offices and drug room down stairs, and living quarters for the acting assistant surgeon upstairs, the pharmacist's cottage, the attendants' quarters, pilot's and engineer's quarters, quarters for the Chinese attendants and for the Japanese laborers, hospital for contagious cases with 14 beds, 3 isolation wards with 2 beds each, and a small hospital for noncontagious cases with 4 beds in separate rooms. The cabin quarters will accommodate about 75 saloon passengers. The cabin quarters building is equipped with kitchen and dining room. The oriental barracks have accommodations and cooking facilities for 600 orientals. There are 3 buildings for European steerage. These buildings hold 300 canvas bunks, and can accommodate that many individuals.

The camp for troops.—This consists of 160 tent platforms erected on legs 2 to 3 feet from the ground. These plank platforms are 14 by 15 feet in size, and are intended to fit the regulation army hospital tent. This camp will accommodate 1,280 soldiers. A steam laundry is in weekly use, and is capable of taking care of any demand that might be made upon it.

To recapitulate.—The station has accommodations at the present time for saloon passengers, 75; European steerage, 300; orientals, 600; army camp, 1,280; total, 2,255 persons. Abundant space is available for extra tentage, if necessary. This is the largest quarantine station in the service, and advantage has been taken of the room available to separate the contagious hospital and quarters from the different detention quarters, and also from the living quarters of the station force.

IMPROVEMENTS AND WORK DONE ON QUARANTINE STATION AND WHARF DURING THE FISCAL YEAR ENDED JUNE 30, 1908.

Work done under contract.—The erection of a 10,000-gallon auxiliary fresh-water tank on a tower 30 feet in height on the island proper.

The erection of 3 water tanks on the wharf on a structure 20 feet in height. One of these tanks of 10,000 gallons capacity supplies

salt water for the baths; one of 5,000 gallons for bichloride solution is used for washing down the decks of ships by means of a garden hose attachment, and one tank of 5,000 gallons is used for fresh water. The runway has been equipped with a half mile of car track.

Work done by station force.—A steam pump capable of pumping 20,000 gallons of water per hour has been installed on the wharf. This is used for pumping salt water to the large bath supply tank.

One large dressing room and one detention room were partitioned off inside the wharf building. A bathroom with showers for salt water was constructed. This will accommodate 32 persons at a time.

With the present accommodations of the wharf it would be possible to bathe and handle the body clothing and baggage of between 500 and 600 orientals in one day.

The tank tower under the tanks has been divided into two stories. The upper is used for the storage of sulphur and the lower has been subdivided into five rooms to be used eventually for cabin, steerage, and second-class toilet accommodations.

The greater part of the interior of the wharf has been painted, as well as all of the new construction work thereon.

A half mile of 2-inch and 1½-inch water pipe was laid from the island to the wharf for supplying the fresh-water tank, as well as for fire purposes.

Three thousand five hundred and thirty yards of road has been laid out, graded, and top dressed with broken coral. A new road was constructed from the island to the mainland across the reef. This saves over 3 miles in the distance the wagon had formerly to go.

All the coal used on the island and that for wharf machinery and launch is now hauled by the station mules and wagons.

About 3 acres have been planted to grass, and several hundred trees have been planted. The majority of the trees are growing nicely.

Since getting the blacksmith and other tools, nearly all of the machine and blacksmith work has been done at the station.

Weep holes at 60-foot intervals have been cut through the concrete wall entirely around the island. This is very necessary, as no provision had been made to allow for subsurface drainage.

When the dredge finished filling in the island it left the surface in a very uneven condition. There were depressions here and there, and an enormous pile of broken coral along the central ridge of the island. The whole of this surface (nearly 40 acres) has been properly graded. The depressions were filled and the broken coral was removed to be used in road making.

THE PLAGUE LABORATORY, QUARANTINE STATION, HONOLULU.

Plague made its appearance in the Hawaiian Islands some eight years ago, probably imported direct from Hongkong. Since then isolated outbreaks have occurred from time to time in Honolulu and Hilo. An outbreak occurred at Aiea plantation, a few miles from Honolulu, in the spring of 1907.

This outbreak although short lived caused considerable uneasiness at the time. Accordingly the territorial board of health requested the service to send an officer to Honolulu to investigate this disease, and by a systematic examination of the rats endeavor to ascertain

whether infection existed among them in time to adopt preventive measures before the occurrence of human cases.

An officer qualified for such work was immediately ordered to Honolulu and a laboratory was established there for the purpose above named. The work of investigation was begun early in July, 1907, and is still being continued. During the past fiscal year 11,433 rats were examined bacteriologically in the laboratory at Honolulu and 11 found to be infected with plague. Some of the infected rats were obtained from Aiea plantation, some from Hilo, and some from Olaa plantation, just outside of Hilo. No infected rodents have been discovered in Honolulu proper during this period nor have human cases occurred there.

This officer, in addition to making complete bacteriological examinations on all the rats brought to the service laboratory, has also acted in an advisory capacity to the territorial board of health in all matters relating to the prevention of the spread of this disease.

Recently, since the chief quarantine officer assumed the duties of president of the board of health, the work of trapping and otherwise destroying these rodents has been placed directly under his charge. Since this change the number of rats examined in the laboratory has greatly increased, so that it is expected that should this work be continued the total number examined the next fiscal year will exceed 25,000, basing the estimate upon the number examined during the past two months.

This laboratory has also investigated all cases of illness among human beings when the attending physician suspected plague infection. Of a number of such cases thus investigated only 5 have been proven to have suffered from plague infection. This latter work has been of benefit in two ways: Not only have cases of plague been detected by bacteriological examination, but several cases were examined in which the clinical symptoms would have justified a diagnosis of plague (in the absence of laboratory facilities), but these have been proven by bacteriological examination to be suffering from other maladies (usually streptococci infection), and thus the port escaped an unnecessary quarantine of thirty days or more.

This officer has endeavored by several means, including a popular public lecture, to educate the public to the simple but all important fact that for practical purposes plague is a disease of the rat which from time to time is transmitted to man, that the rat is the one important factor in its spread, and that it is the duty of everyone to keep his premises as free as possible from these rodents, first attempting to do so themselves and if they fail to call upon this laboratory for aid and advice. A change has been noticed in the nature of the requests made upon this laboratory which speaks for the success of the educational measures. At first this laboratory received specimens of oriental foodstuffs, sweepings from houses, etc., accompanied by a request to examine them for plague. Such examinations were carefully and cheerfully made, and a negative report rendered, as might be expected by one familiar with the disease. During the past few months no such material has been sent in for examination, but on the other hand, dead rats are promptly reported, advice asked regarding methods of destroying, or request made that this laboratory conduct the work of destruction in some store or residence badly infested with these rodents. Most of the work of

this laboratory has been confined to Honolulu and Aiea plantation, but a nonmedical inspector of the territorial board of health, stationed at Hilo, has acquired sufficient proficiency with the microscope to make a preliminary examination of rodents collected there and to send suspicious specimens to this laboratory for complete examination by Passed Asst. Surg. D. H. Currie, in charge.

A classification is being made as to the several species of rats found in these islands, and the average per cent of each. This work is as yet incomplete. One interesting fact, however, has already been shown, viz, that *Mus rattus* or black rat by becoming largely arboreal in its habits has escaped, or at least delayed, its destruction by the *Mus decumanus*, so that instead of being rather rare in comparison to *Mus decumanus*, it is the most common rat of the islands. *Mus alexandrinus*, another rather uncommon species, closely allied to *Mus rattus*, is rather common there.

TRANSACTIONS, INCOMING QUARANTINE AT SUBPORTS, FISCAL YEAR ENDING JUNE 30, 1908.

Subport.	Steam vessels inspected.			Sailing vessels inspected.		
	Number.	Crew.	Passengers.	Number.	Crew.	Passengers.
Hilo, Hawaii.....	22	1,048	511	30	389	19
Mahukona, Hawaii.....	10	463	460	17	157	.....
Kawaihae, Hawaii.....	10	500	427	.....	.....	.....
Kahului, Maui.....	13	544	258	10	133	1
Kihei, Maui.....	.....	.....	.....	1	18	.....
Lahaina, Maui.....	16	737	1,247	6	75	11
Koloa, Kauai.....	11	440	336	1	10	.....
Total.....	82	3,732	3,239	65	782	31

MARINE HOSPITAL DIVISION, HONOLULU—CARE OF SEAMEN.

Summary for fiscal year ended June 30, 1908.

Patients on hand July 1, 1907.....	17
Patients admitted during fiscal year.....	186
Revenue-cutter seamen treated.....	1
Foreign seamen treated.....	0
Surgical operations.....	43
Deaths.....	6
On hand June 30, 1908.....	11
Outpatient relief:	
Number of cases treated.....	380
Number of times relief furnished.....	701
Number of foreign seamen treated.....	0
Number of cases rejected.....	0
Number of physical examinations.....	19

The statistics regarding the medical inspection of immigrants in Hawaii are included in the chapter on immigration in a subsequent portion of this report.

QUARANTINE IN PORTO RICO.

The chief quarantine officer for Porto Rico, Passed Asst. Surg. M. H. Foster, stationed at San Juan, transmits a report for the fiscal year ending June 30, 1908, in substance as follows:

During the year the United States quarantine laws and regulations were enforced by officers of the service in Porto Rico at eight ports, under the general supervision of a chief quarantine officer stationed

at San Juan, the capital. Lying far below the frost belt, with territory always infectible, and a constantly increasing nonimmune population, this island has a great deal of commerce and considerable passenger traffic with ports endemically infected with yellow fever. Under these conditions the prevention of the introduction of cases of this disease becomes a very important function of the public sanitarian, and has been the chief work of the quarantine in this locality.

Practically all of the steamers from infected places simply call at the different ports of the island for a few hours and are held in quarantine during their stay, but permitted to take on and discharge cargo into lighters by the aid of immune stevedores. Any non-immune passengers desiring to land are sent to the quarantine stations for five days' detention. Under this plan no steamer is permitted to remain in port over twenty-four hours without disinfection, nor is any working of cargo permitted after sunset. This system, while it throws considerable labor on the quarantine service in the way of maintaining guards, subsisting and caring for passengers while they are at the stations, works extremely well. Practically no delay is imposed upon the vessels, most of which carry mail, and yet the territory is amply protected.

In carrying out this particular phase of the work, 27 vessels were sulphurized to kill mosquitoes, 173 vessels were held in quarantine but permitted to transact certain business under suitable restriction, 900 persons were detained at the stations for a sufficient length of time to cover the five days' incubation period of yellow fever, and 18 cases of suspicious illness were taken to the quarantine hospital and held under observation until a diagnosis could be made.

During the winter months certain tourist steamers advertise a round trip from New York, making brief stops of a few hours to several days at various ports and islands in the West Indies, the Canal Zone, Venezuela, and Cuba. During the past season one line of steamers, despite the fact that they were amply warned in advance against it by the officials at San Juan and by the bureau, planned the itinerary of their winter cruise so that they touched at suspected and infected ports, and permitted their passengers to land freely at these places before going to Porto Rico. Under such conditions the proper handling of these tourist steamers became a matter of great difficulty and considerable importance. The Hamburg-American steamer *Oceana* included San Juan and Ponce in her route in an excursion of this kind. Upon her first arrival, as she had been in suspected ports only, permission was given to land the passengers for twenty-four hours. It was found, however, that this procedure was not consistent with good quarantine management, as there was no control over the tourists after they had once gone ashore, and three of the crew were permitted by the steamer to remain on land. It also appeared to be impossible, under the conditions present, to prevent persons from the shore visiting the steamer. Accordingly, on the next trip of the *Oceana*, as she had landed her passengers in Trinidad for a considerable space of time, and Trinidad was known positively to be infected, a landing was refused to all tourists, unless they would comply with the regular period of detention. This action was the subject of a great deal of criticism by all parties interested, but the incident of the Norwegian steamship *Britannic* proved very plainly the necessity of such a course. The *Britannic* had laid

in the harbor of Trinidad a few weeks previously, under practically the same conditions as the *Oceana*, only with a great deal less communication with the shore. Three days after her departure from that port the cook of the steamer developed a typical case of yellow fever, despite the fact that he had not been ashore during the stay of the vessel. The steamer *Oceana* arrived in Porto Rico two and a half days after leaving Trinidad, and the possibility and even probability of a tourist developing the disease when ashore and out of control of the quarantine authorities is plainly shown. During the past ten years, while the present regulations have been in force, no case of yellow fever has appeared in any part of the island, although before that period severe epidemics occurred at frequent intervals.

One case of smallpox was taken off a vessel and suitable disinfection performed.

The appearance of plague in Venezuela in March caused considerable anxiety among the people of the island. Frequent conferences between the governor, insular health authorities, and the officers of the service were held from time to time to consider the matter, and such advice as seemed necessary concerning interior sanitation was given by the service. The governor referred all special measures against this disease, proposed by the superior board of health, to the chief quarantine officer for his recommendation. A special representative of the service was detailed by the Surgeon-General to visit all the ports and consult with the local health officers and mayors relative to the precautions to be taken by the local authorities. A general campaign against rats was instituted, and good results will certainly follow. Very stringent precautions have been taken with all vessels coming from Venezuela and other places which might carry refugees from there. In view of these very rigorous measures and the limited communication held with Venezuela, it is considered that further anxiety on this point is unnecessary.

During the year the total transactions at all the ports were as follows: Vessels inspected, 569; vessels passed, 396; vessels held in quarantine, 173; vessels sulphurized to kill mosquitoes, 27; vessels disinfected, 2; passengers inspected, 25,904; passengers detained in quarantine, 900; number of sick treated in quarantine hospital, 18; number of cases of quarantinable diseases treated, 1; crew inspected, 27,285; immigrants inspected, 2,148; bills of health issued, 1,264.

Summary of transaction at Ponce, P. R., during the fiscal year ending June 30, 1908.

Number of vessels inspected.....	142
Number of vessels held in quarantine.....	61
Number of vessels fumigated.....	5
Number of passengers inspected.....	7, 091
Number of passengers held in quarantine.....	269
Number of sick removed from vessels and isolated.....	4
Number of crew of vessels inspected.....	7, 111
Number of crew of vessels held in quarantine.....	0
Number of pieces of baggage or freight disinfected.....	192
Number of bills of health issued.....	297
Number of immigrants inspected.....	301

NOTE.—The transactions at the ports of Porto Rico other than San Juan and Ponce are unimportant from a quarantine point of view. Practically all vessels from foreign ports enter either at San Juan or Ponce, and the other stations are maintained principally to guard against cases of quarantinable disease occurring on coastwise vessels or upon vessels of small class which may have visited infected ports.

FOREIGN QUARANTINE.

FRUIT PORT INSPECTION SERVICE.

Acting assistant surgeons were detailed in accordance with custom to enforce at certain foreign fruit ports the quarantine regulations relating to fruit vessels, which permit the entry of such vessels to ports in the United States without detention at quarantine stations.

The reports from the officers at the several stations follow:

SANTA MARTA, COLOMBIA.

Acting Asst. Surg. C. L. Mengis reports as follows:

Season of 1907. Nine vessels were inspected, all steamers, with 450 crew, 15 passengers embarking from the port, and 9 passengers in transit. The health conditions were satisfactory, though it was proved beyond reasonable doubt that yellow fever had prevailed during the early part of the year. No officer detailed for season of 1908, being unnecessary.

PUERTO CORTEZ, HONDURAS.

Acting Asst. Surg. R. P. Ames reports as follows:

Season of 1907 (July 1 to October 31). Sixty-nine vessels with 1,617 crew and 175 passengers were inspected. Two vessels were fumigated. During this period the health conditions of the port were satisfactory.

Season of 1908 (April 1 to June 30). Sixty-one vessels with 1,324 crew and 87 passengers were inspected. Health conditions during this period were reported as excellent.

TELA, HONDURAS.

Acting Asst. Surg. C. K. Roe, reports as follows:

Season of 1907 (July 1 to October 31). Forty-eight vessels with 1,174 crew and 8 passengers were inspected.

Season of 1908 (April 1 to June 30). Twenty-six vessels with 640 crew and 5 passengers were inspected. Health conditions during this period were reported satisfactory.

CEIBA, HONDURAS.

Acting Asst. Surg. Virgil C. Reynolds reports as follows:

Season of 1907 (July 1 to October 31). Seventy-nine steamers with 1,702 crew and 89 passengers were inspected. The health conditions during this period were reported as satisfactory.

Acting Asst. Surg. Allen J. Jumel reports as follows:

Season of 1908 (July 1 to October 31). Forty steamers with 934 crew and 60 passengers were inspected. One steamer was fumigated. Health conditions during this period remained satisfactory.

PORT LIMON, COSTA RICA

Acting Asst. Surg. D. W. Goodman reports as follows:

Season of 1907 (July 1 to October 31). One hundred and fifty-seven vessels, with 6,756 crew, 1,538 passengers in transit, and 1,663 direct passengers, were inspected. During this period no quarantinable disease prevailed.

Season of 1908 (April 1 to June 30). One hundred and twenty vessels, with 5,298 crew and 1,044 transit and 1,494 direct passengers, have been inspected. During this period 2 cases of yellow fever, originating in Punta Arenas and one of which was carried to San Jose for treatment, were reported.

BLUEFIELDS, NICARAGUA.

Acting Asst. Surg. T. B. L. Layton reports as follows:

Season of 1907 (July 1 to October 31). Sixteen vessels, with a crew of 144 and 113 passengers, were inspected. Health conditions during this period were reported as excellent.

Season of 1908 (April 1 to June 30). Thirteen vessels with 264 crew and 95 passengers were inspected, and for this period there were no quarantinable diseases reported.

BOCAS DEL TORO, PANAMA.

Acting Asst. Surg. Paul Osterhout reports as follows:

Season of 1907 (July 1 to October 31). Seventy-eight vessels, with 1,728 crew and 115 passengers, were inspected. During this period important engineering works for the improvement of the sanitary condition of the city were begun, and were in progress at the date of the report.

Season of 1908 (April 1 to June 30). Sixty-two vessels, with 1,814 crew and 99 passengers, were inspected. The sanitary work was continuing, and health conditions remained satisfactory.

LIVINGSTON AND PUERTO BARRIOS, GUATEMALA:

Acting Asst. Surg. L. A. Wailes reports as follows:

Season of 1907 (July 1 to October 31). Fifty vessels, of which 36 were cleared from Puerto Barrios, with a total of 90 passengers, were inspected.

Season of 1908 (April 1 to June 30). Thirty-four vessels, with 309 passengers, were inspected. Passenger traffic was suspended on May 15, on account of the appearance of yellow fever in Gualan and Zacapa. The progress of engineering work for the betterment of the sanitary conditions of Puerto Barrios is reported.

BELIZE, BRITISH HONDURAS.

Acting Asst. Surg. C. L. Mengis reports as follows:

Season of 1907 (July 1 to October 31). Forty-three steamers and 3 sailing vessels were inspected, and 5 steamers were fumigated. There were 1,290 crew and 324 passengers on steamers, and 18 crew on sailing vessels. During this period health conditions were reported as good.

Season of 1908 (April 1 to June 30). Thirty-six steamers and 4 sailing vessels, with 1,029 and 29 crew, respectively, and 429 passengers, were inspected. Two hundred and ninety-two passengers in transit were also inspected. Health conditions have remained satisfactory.

GENERAL INSPECTION OF FRUIT PORTS.

In addition to the inspection service maintained at the various fruit ports, as above detailed, Acting Asst. Surg. J. N. Thomas made frequent inspections of the fruit ports themselves, and of the points in the interior of Guatemala, Honduras, and Costa Rica, and in addition visited from time to time the ports of Mexico. While engaged in these trips he investigated rumors of the prevalence of yellow fever, assisted in the diagnosis of suspected cases, and brought about uniformity in the enforcement of the fruit-port regulations in the various ports. He paid special attention to the reported existence of yellow fever at interior points, and was enabled to furnish the officers on duty at the fruit ports with the latest and most reliable information as to disease and sanitary conditions prevailing in the interior. In addition to the inspection of the fruit ports and of Mexican ports, he also visited the island of Cuba, and inspected ports and places in the island outside of the city and province of Habana. These frequent inspections were found to be of much value, and the operations at the various fruit ports during the season of 1908 were conducted with a minimum of friction and of loss of time to vessels and passengers.

INSPECTION AT OTHER FOREIGN PORTS.

In addition to the medical officers detailed to the several fruit ports above mentioned, officers were also detailed to the offices of United States consuls, in accordance with the act of Congress approved February 15, 1893, in the following-named ports, for the purpose of enforcing the Treasury regulations provided for such ports, and signing the bills of health in conjunction with the consuls.

At certain of the ports, viz, Cartagena, Bridgetown, Castries, and St. Thomas, officers were detailed, not only to certify as to the health conditions of vessels leaving these ports for the United States, but also to perform the necessary disinfection of said vessels when their original port of departure was an infected or suspected port, said vessels calling at the stations named, except Cartagena, chiefly for coal. By fumigating said vessels, either for the destruction of mosquitoes or the destruction of rats, and giving a certificate with regard to such disinfection, the time consumed by the passage of the

vessel from the above-named ports to the quarantine stations in the United States was accredited to the vessel as a deduction from the time which might otherwise be demanded for detention at the United States quarantine station.

At a number of the other ports named below, particularly those in China and Japan and Naples, the officers, in addition to their quarantine inspection, made inspection of immigrants with reference to contagious or infectious diseases which might debar them from admission on arrival in the United States. These inspections were made in accordance with requests from the Immigration Service and the steamship companies, the officers exercising no positive right of exclusion, but informing the steamship companies and others of those who would be subject to rejection at the port of arrival under the immigration regulations, thus saving the steamship companies the penalty imposed by law for bringing to the United States such immigrants, and materially aiding also in this manner the enforcement of the immigration regulations.

Following are extracts from the reports made to the bureau by the officers stationed at the ports named:

HABANA, CUBA.

The following is an extract from the report of Passed Asst. Surg. J. W. Ames for the fiscal year ending June 30, 1908:

As in previous years the paramount duty of the service at this port was the prevention of the spread of yellow fever from Cuba to the United States or its dependencies. Unlike any similar term, however, since the establishment of the Republic in 1902, this effort involved trying and long-continued responsibility, demanding constant vigilance of the entire personnel, by reason of the persistence of yellow fever throughout practically the entire fiscal year.

To more effectually safeguard the health interests of southern ports, in view of the wide dissemination of fever in Cuba, and the added fact of higher temperatures than usual prevailing at the former points, the season of close quarantine instituted on May 28, 1907, was continued until December 16. The measures adopted to carry out the regulations applicable for sanitary work of this character involved:

Supervision and control of passenger traffic.

All nonimmune passengers bound for ports within infectible territory of the United States were detained at Tricornia quarantine, five days being required for those entering via New Orleans, and six days for persons sailing by way of Mobile or for points in Florida.

Exceptions to these regulations were made in the following instances:

1. Passengers embarking for Galveston were allowed to proceed after preliminary medical examination, and following fumigation of the vessel, the voyage to that port consuming five days.

2. Army officers and their families and detachments of the Army of Cuban Pacification were permitted to embark on army transports sailing for Newport News, if free from quarantinable disease.

The transports were first thoroughly disinfected in open bay, and on arrival at Cape Charles quarantine were refumigated and the

vessel with entire personnel held to complete the incubation period of five days.

This concession was rendered relatively safe through the rigid discipline enforced and the daily examinations by the transport surgeon, a commissioned medical officer of the army.

The selection of Tricornia for a detention camp, made in June of the previous year at the suggestion of the provisional government, was commendable. Its complete isolation, notwithstanding its close proximity to the city, served to secure the greatest measure of safety with the least discomfort for detained passengers.

During the season 1,660 persons were registered at the station. Of these, 30 developed fever and were conveyed by screened launch and ambulance to Las Animas hospital for treatment. While yellow fever was excluded in all of these cases, it will readily be seen that the weeding out of fever patients before departure eliminated the possibility of quarantine at a southern port, with the attendant expense and delay to shipping. In addition to those developing abnormal temperature at Tricornia, 66 persons were found with fever at the preliminary examination before admission. These were placed under observation of a special agent of the board of health in Habana.

A military guard was employed throughout the entire season of close quarantine. At the beginning this guard consisted of detachments of the artillery corps of the Cuban army, but, friction occurring frequently between them and the attendants, a special police service was organized by Dr. F. E. Menocal, commissioner of immigration, and a former officer of the service, to whose kindly interest the successful conduct of the camp was very largely due.

In order to more closely supervise the segregation of passengers, the officers on duty at Habana alternated in spending the night at Tricornia. The best evidence of a satisfactory administration was the fact that during the six months' occupation, with a personnel drawn from every stratum of a cosmopolitan city, no complaints were received.

Supervision and treatment of shipping.

All vessels destined for ports south of the southern boundary of Maryland were fumigated with sulphur, the pot method being employed exclusively and 2 pounds of the culicide used per 1,000 cubic feet or for any separate compartment of less capacity. The minimum exposure was for two hours.

The fumigations were practiced in the open bay, sufficiently removed from the wharves to prevent reinhabitation by mosquitoes, and vessels were required to clear before nightfall. In numerous instances where contrary winds served to delay the departure of sailing craft, refumigations were required. The materials for these disinfections were furnished, as usual, by the owners or agents, the work being done by our attendants under the direction of a service officer. Only necessary collections of water were permitted aboard ship and these were kept covered or oiled. In addition to the destruction of mosquitoes, all vessels carrying passengers were provided with guards, selected by the service and paid by the steamship company.

The duty of these sanitary police was to cooperate with the ship's officers in restricting communication with the town, and especially to apprehend seamen in their frequent attempts to go ashore during

the dangerous night hours. Their services constituted an important supplementary safeguard, and in only one instance was there any collusion shown between them and the crew.

Yellow fever.—An examination of the following data will show that from its reintroduction in the autumn of 1905 yellow fever has made steady progress in Cuba, both in the number of cases and in the territory involved.

At first practically confined to this city, it obtained a firm foothold in Matanzas Province in 1906, and has since spread eastward until foci have been reported in every province of the Republic, except Pinar del Rio.

Notwithstanding the second intervention brought to the assistance of the Cuban health authorities, highly trained specialists from the Army Medical Corps and abundant means from the provisional government, the greatest difficulty was experienced in checking the advance of yellow fever in the country districts.

Several factors combined to effect this seeming contradiction of our contention that yellow fever is easily controlled.

There had been a great lapse in sanitation everywhere outside of Habana following the departure of the American forces in 1902.

Three years of freedom from an infection that had exacted its annual tribute in human life for upwards of two centuries had given the people a false sense of security. The chief obstacle, however, in the subjugation of fever in Cuba during recent years is the utter indifference, not to characterize it by a stronger term, of the public toward the measures experience has shown are essential to render a campaign of this nature successful. Cuban families being, for the most part, immune, vigorous objection is frequently offered to the fumigation of their homes or the policing of their premises, which, they assert, are enforced solely for the protection of foreigners. Of the 180 cases of yellow fever during the past year, but 10 patients were Cubans. The persistence of this affection in the rural districts of the island, and its total disappearance in this city, demonstrate that similar work will not bring about equal results, unless the hearty cooperation of the people is assured.

Realizing its necessity, an act was promulgated in August, 1907, nationalizing the sanitary service, abolishing municipal boards, and placing public health affairs in charge of a central body, presided over by the chief sanitary officer.

A local health officer was appointed for each municipality, funds were provided to carry out sanitary measures, and an earnest effort made to hold the service independent of all political considerations.

In view of the continuance of yellow fever during the winter season, 20 cases having been reported (after January 1, 1908) from the dozen or more foci throughout the island, quarantine was declared against Cuba, effective on April 1 (subsequently postponed by executive order until April 6). On representations, however, of the Provisional Government and the national sanitary department that Habana and its environs were free of yellow-fever infection, an arrangement was effected whereby Habana, Camp Columbia, and Marianao would constitute a zone of safety and be exempt from quarantine restrictions, while all other ports would conform to the regulations which obtained last season.

This agreement is in force at the close of the fiscal year.

The following tables summarize yellow fever records for the past three years:

	Cases.	Deaths.	Mortality.	Provinces affected.
Fiscal year ending June 30, 1906:			<i>Per cent.</i>	
Habana	82	28	34	} Habana and Matanzas.
Interior	11	3	27	
Total	93	31	33	
Fiscal year ending June 30, 1907:				
Habana	61	9	15	} Habana, Matanzas, and Santa Clara.
Interior	45	20	44	
Total	106	29	27	
Fiscal year ending June 30, 1908:				
Habana	9	1	11	} Every Province except Pinar del Rio.
Interior	171	55	32	
Total	180	56	31	

Personnel.—Passed Asst. Surg. H. A. Stansfield having been detached on July 1, 1907, the service was temporarily in charge of Acting Asst. Surg. E. F. McConnell until relieved by Passed Asst. Surg. J. W. Amesse on August 26. On January 6, 1908, the latter officer was withdrawn for temporary duty in the Hygienic Laboratory, the station being left in charge of Acting Asst. Surg. J. N. Thomas until the return of the commanding officer on April 5, when Doctor Thomas proceeded to his regular station at New Orleans.

At the close of the year there remain on duty in Habana, Passed Asst. Surg. J. W. Amesse, in command; Acting Asst. Surg. Pedro Villoldo, Acting Asst. Surg. Rupert Colmore, one clerk, one fumigator, and one sanitary guard.

The launch employed by the service has a crew of two persons, paid by the contractor.

Quarantine operations.—The measures outlined for the protection of American territory involved the following extensive transactions: Bills of health issued, 1,227; passengers inspected, 31,266; passengers not inspected, 3,584; members of crew inspected, 44,981; members of crew not inspected, 11,654; vessels fumigated, 354; immunity certificates issued, 1,907; vaccination certificates for Canal Zone, 205; passengers detained in Tricornia, 1,660; health certificates issued (season 1908), 3,886.

MORTALITY REPORT FOR HABANA.

Month.	Deaths.	Month.	Deaths.
1907.		1908.	
July	676	January	507
August	584	February	499
September	478	March	513
October	441	April	497
November	415	May	525
December	464	June	510
		Total	6,089

Population, 300,000; mortality rate, 20.29 per 1,000.

Transactions at Mariel Quarantine.—The national sanitary department reports that three infected vessels arrived at this station for treatment during the year, as follows: French steamer *Navarre*, from Spanish ports, November 4, 1907, with smallpox; American liner *Esperanza*, March 23, 1908, smallpox; Spanish steamer *Montserrat*, April 2, 1908, smallpox.

CIENFUEGOS, CUBA.

The following is from the report of Acting Asst. Surg. C. J. Marsillan, on duty at Cienfuegos from August 13, 1907, to June 30, 1908.

STATEMENT OF INSPECTION SERVICE AND FUMIGATIONS.

Months.	Vessels inspected.	Vessels inspected and fumigated.	Bills of health is- sued.	Crews—			Immune certi- ficates issued.	Passengers.
				Inspected.	Landed here.	Taken on here.		
1907.								
July	10	9	19	459	0	1	0	10
August	11	11	22	632	0	0	3	4
September	5	9	14	423	0	2	8	0
October	6	11	17	506	4	0	3	10
November	7	12	19	517	2	2	1	5
December	15	7	22	628	3	1	0	7
1908.								
January	16	0	16	491	1	0	0	106
February	22	2	24	611	1	2	0	8
March	16	2	18	552	0	1	0	6
April	19	14	33	922	1	0	8	9
May	6	14	20	591	1	2	10	14
June	7	10	17	497	2	1	4	44
Total	140	101	241	6,829	15	12	37	223

During the month of July, 1907, to August 13 of same year there was no medical officer in this station, so that all information was taken from transactions of the American consulate, except in matter of fumigations and inspection of vessels, which were done by myself with authorization from the consul.

Inspection of vessels.—One hundred and forty vessels have been inspected by this office during the year, from sunrise to sunset, and in later hours when proper and required. Inspections mostly have been practiced by taking temperatures of members of crews, and following precepts of quarantine laws and regulations of the United States. Sometimes when vessels go via some foreign port, as Nassau, New Providence, for example, they are boarded for inspection if conditions demand it, otherwise only by taking the captain's verbal declaration regarding the health of the crew and the sanitary conditions of the vessel. Any man found with fever was sent to hospital for observation and treatment, and when only with higher temperature than normal always mentioned so on the bill of health granted to the vessel.

Fumigation of vessels.—One hundred and one vessels were fumigated during the fiscal year when bound for ports in the United States south of the southern boundary of Maryland, and also when

necessary from any cause. All these fumigations have been done according to the quarantine regulations and as already stated in my report of last fiscal year. All fumigations intended to kill mosquitoes and vermin as much in steamers as in sailing vessels. Owing to the fumigations, the number of rats on board of vessels is reduced considerably.

MATANZAS, CUBA.

The following is from the report of Acting Asst. Surg. E. F. Nuñez:

At the close of the previous fiscal year (1907) yellow fever was still prevalent in this province in spite of the repeated efforts said to have been made by the Cuban authorities to eradicate the disease. Since then a reorganization of the sanitary department of Cuba has been accomplished, and by providing it with all the necessary resources and personnel under the direct administration of the United States Government, a favorable change in the sanitary status of the city and province has taken place.

Following is a recapitulation of the cases of yellow fever reported within the city and province during the fiscal year 1908:

On July 2, 1907, one case, traceable to Union de Reyes, was detected in a Spanish subject at the Covadonga Hospital in Habana; recovered.

July 8, one case in a Spanish subject, also traceable to Union de Reyes, was imported into Santiago de Cuba on the steamship *Porto Rico* from Habana; recovered.

August 4, one case reported in the city as imported from the rural town of Mocha, in a Spaniard; case died.

August 9, one case confirmed at Alacranes, in a Spaniard; died.

August 15, two cases reported in Matanzas as imported from Mocha, both Spaniards; one recovered and the other died.

August 17, one case reported at Alacranes in a Canary Islander; recovered.

August 26, one case in a Cuban boy at Alacranes; recovered.

September 10, one case in a Spanish boy at Bermeja, close to Alacranes; died.

September 23 and 24, two cases in Spanish subjects detected at a sugar estate near Jovellanos; one case died.

September 29, one case ending in death September 27, in a Spaniard, at Union de Reyes.

October 1, one case reported at Alacranes; recovered.

October 16, two cases in native Cubans reported at a plantation colony close to Union de Reyes; one case recovered and the other died.

October 18, one case reported at Alacranes, in Spanish subject; recovered.

October 28, one case in a Canary Islander, traceable to Bermeja, detected at Alacranes; died.

October 30, one case originating in the city of Matanzas, in a Spaniard; died.

November 15, one case in a Spaniard residing at Alacranes; died.

November 21, one case in a Spanish woman residing at Alacranes; died.

November 26, one case in a Spaniard detected at Union de Reyes; recovered.

During the latter part of November a second case, also in a Spanish subject, traceable to Union de Reyes, was detected at the Covadonga hospital in Habana, where the case died December 2.

February 7, 1908, one case imported into Cardenas from the island of Trinidad, British West Indies, on the Norwegian steamship *Britania*; died. This was the last case of yellow fever reported, making a total of 23 cases, with 13 deaths, for the past fiscal year.

On November 15, 1907, the bureau directed that the season of close quarantine be maintained until November 30. This order was amended on December 12, extending such restrictions until December 15, when quarantine was discontinued.

Under date of March 20, 1908, the bureau directed that the imposition of close quarantine with reference to Cuban ports be deferred until Monday, April 6. The close quarantine has been enforced since that date.

Since April, 1908, the fruit ports regulations as directed by the bureau against certain steamers devoted to that trade plying between Mobile, Ala., and Cuban ports, have been carried out.

No vessel entered this harbor with any quarantinable disease on board during the year. On one occasion, during last July, the Danish steamship *Nordkap*, originating from Panama, arrived here with malarial infection on board (14 cases of malarial fever having occurred among her crew from the time the vessel left the port of origin), and it was fumigated when about to leave this port.

No effort has been made to replace the floating disinfecting plant which was turned over in good operation to the Cuban authorities during the previous intervention. As stated in one of my previous reports, the barge on which the disinfecting outfit was installed was allowed to sink alongside the Dubrocq wharf already being in an unserviceable condition while all her equipment had been previously taken off and stored away.

A sufficient appropriation is said to have been made by the Cuban Government a long time ago for a new barge, but according to information, the funds have since been disposed of for some other purpose, and the reestablishment of the plant is no longer considered. Neither has there been any provision as yet made for the detention and observation ashore of passengers originating from infected ports; therefore, in such cases, passengers have either had to be remanded, when possible, to other ports where these facilities exist or else ordered to return to their port of origin on same vessel.

During August, 1907, Cuba abolished all quarantine restrictions against Mexican ports; but in the month of September following, yellow fever reappeared at Veracruz, and quarantine was again decreed against that port. Subsequently, during last October, these restrictions were again discontinued, and since then every Mexican port has been considered clean.

Since March 12, 1908, quarantine has been enforced by Cuba as regards yellow fever against the following countries: Guatemala, Honduras, Nicaragua, Costa Rica, Republic of Panama (the Canal Zone being excepted), the British, Dutch, and French Guianas, Brazil, and the islands of Trinidad, Curaçao and Barbados.

During the beginning of June, when, through a cablegram from the bureau, the first news reached this island of the presence of plague at La Guaira, Venezuela, all Cuban ports, except Mariel

quarantine station, were closed to traffic against that country. Stringent quarantine measures were also directed against passengers and ships originating from Colombia, especially the port of Cartagena, which maintains more frequent communications with Cuba. Lastly, under date of June 5, 1908, the imposition of close quarantine also with reference to bubonic plague was directed by the Government of Cuba against the island of Trinidad, British West Indies.

Summary of the transactions for the fiscal year, 1908: Bills of health issued, 212; crews inspected, 5,046; passengers, 336; vessels fumigated and certified to, 61; certificates of immunity granted, 12; certificates of vaccination, 7.

SANTIAGO DE CUBA.

Acting Asst. Surg. Richard Wilson, on duty at this port, reports in part as follows for the fiscal year 1908:

Bills of health were issued to 277 vessels bound for the United States and its dependencies; 129 vessels were inspected and 30 fumigated. On these vessels there were 10,958 crew and 6,034 passengers.

The number of certificates of immunity to yellow fever issued during the year was 75.

On April 11, 1908, Acting Asst. Surg. J. N. Thomas came on a tour of inspection and remained one day.

New orders.—On May 28, 1907, I received a telegram telling me to enforce paragraph 108, with exception of immunity requirement of crews, but allowing no communication with shore except what was absolutely necessary to transact business. This was still in force the beginning of this fiscal year.

On account of the yellow fever at the western end of the island the close-quarantine season was extended, first, until November 30, 1907 (by Department Circular No. 63, dated October 29, 1907); second, by telegram of the Surgeon-General, dated November 30, 1907, it was continued until further notice. Finally a bureau telegram, dated December 14, 1907, informed me that the close quarantine season would end December 15.

This decision applied only to the United States. Porto Rico continued all quarantine restrictions against Cuba, and vessels going there were required to be fumigated. This was told me by Passed Asst. Surg. J. W. Ames, at Habana, in a telegram dated December 21, quoting bureau cablegram just received.

On March 30, 1908, I received a bureau cablegram informing me that the close-quarantine season would begin on April 6.

VERACRUZ, MEXICO.

Acting Asst. Surg. John Frick reports as follows:

Season of 1907 (July 1 to October 31, 1907), 61 vessels were inspected departing from the port, and 67, including some via vessels, were disinfected. On these vessels there were a total of 5,441 crew and 2,319 passengers. Health conditions at the port were generally satisfactory.

Acting Asst. Surg. C. C. Jacobs reports as follows:

Season of 1908 (July 1 to November 30, 1908), 101 vessels were inspected and fumigated. These vessels carried a total of 6,789 crew and 3,004 passengers.

SALINA CRUZ, MEXICO.

Acting Assistant Surgeon McPherson reports as follows:

For the fiscal year ended June 30, 1908, 26 vessels bound for ports in the continental United States and Hawaii were inspected and disinfected. No quarantinable diseases prevailed during this period at the port.

COATZACOALCOS, MEXICO.

Acting Asst. Surg. W. R. P. Thompson reports as follows:

During the fiscal year ended June 30, 1908, 101 vessels, with a total of 3,501 crew and 22 passengers, were inspected. During the month of August, 1907, there were two cases of yellow fever treated in the City Hospital.

PROGRESO, MEXICO.

Acting Asst. Surg. J. F. Harrison reports as follows:

Season of 1907 (July 1 to October 31, 1907), 72 vessels were inspected and 29 were fumigated, with a total of 3,640 crew and 893 passengers. During this period the health conditions of the port were generally satisfactory.

Season of 1908 (April 1 to June 30, 1908), 59 vessels were inspected and 28 were fumigated. These vessels carried a total of 443 passengers and 2,154 crew.

CARTAGENA, COLOMBIA.

Acting Asst. Surg. C. C. Jacobs reports as follows:

Season of 1907 (July 1, to October 31, 1907), bills of health were issued to 52 vessels with 3,768 crew and 442 passengers embarking and 2,690 in transit. Fifteen passengers were vaccinated, and one vessel was fumigated. No officer detailed for the season of 1908.

COLON, PANAMA.

Acting Asst. Surg. W. W. Scales reports as follows for the season of 1907, July 1 to December 31:

Vessels inspected, 210; vessels fumigated, 37; crews inspected, 13,794; passengers inspected, 11,063; laborers inspected, 1,608.

Since March 1, 1908, no special officer has been detailed at Colon, information being furnished by the regular quarantine officer for the port of Colon, who is an officer of the Public Health and Marine-Hospital Service. For the same reason, there has been no special appointment for the quarantine at Ancon, Canal Zone.

BRIDGETOWN, BARBADOS.

Acting Asst. Surg. R. H. Urquhart reports as follows:

Season of 1907 (July 1 to October 31, 1907), 142 vessels were inspected, and 22 fumigated.

Season of 1908 (May 1 to June 30, 1908), 200 vessels with 3,340 crew were inspected, and 29 were fumigated. During this period 2 cases of smallpox and 1 case of yellow fever, all imported, prevailed.

CASTRIES, ST. LUCIA.

Acting Asst. Surg. A. J. Maylie reports as follows:

Season of 1907 (July 31 to October 31, 1907), 185 vessels were inspected, and 113 vessels were fumigated. These vessels carried 5,886 crew and 189 passengers. During this period the health conditions at the port were good.

Season of 1908 (April 15 to June 30, 1908), 26 vessels were inspected, and 13 fumigated. These vessels carried a total of 838 crew and 18 passengers.

ST. THOMAS, DANISH WEST INDIES.

Acting Asst. Surg. W. F. Wild reports as follows:

Season of 1907 (July 1 to November 2, 1907), 84 vessels were inspected, and 8 fumigated.

Season of 1908 (April 20 to June 30, 1908), 30 vessels were inspected, and 2 vessels were fumigated. Good health conditions prevailed during the entire periods.

CALLAO, PERU.

Asst. Surg. William M. Wightman reports for Callao, Peru, for the ten months from July 1, 1907, to April 30, 1908, as follows:

One hundred and fifty-six vessels were dispatched; 103 fumigated, and 53 inspected and passed, or, in the case of navy vessels, passed on certificate of medical officer; 7,558 crew, 3,217 cabin passengers and 2,370 steerage passengers were inspected; 1,864 persons received health certificates; 455 persons received vaccination certificates; 332 pieces of baggage were inspected and passed; and 2,817 pieces disinfected.

Bubonic plague, now thoroughly endemic in Peru, again showed an increase over the preceding year. From July 1, 1907, to April 21, 1908 (nine months, twenty-one days), 1,174 cases, with 664 deaths, were reported for the entire country, as against 917 cases, with 510 deaths, for the whole of the preceding fiscal year.

The figures on plague for the capital and its port, the most important from the point of view of maritime quarantine, were, for the same period in Lima, 128 cases and 75 deaths, and in Callao, 42 cases and 17 deaths.

The campaign against plague in the latter town, reported in the weekly Public Health Reports, was unfortunately allowed to lapse, owing chiefly to lack of municipal appropriations for the purpose. At present antiplague work in Callao is confined to isolation of cases, fumigation of houses where human cases or dead rodents are discovered, and some efforts to destroy vermin on the wharves.

Of other localities, Trujillo, as usual, suffered by far the worst, reporting 477 cases with 249 deaths. It should be noted, though, that these figures do not apply solely to cases originating in the city, but include many from the surrounding sugar plantations, which are worked largely by oriental laborers, among whom the plague finds a great number of its victims. Salaverry, the port for Trujillo, escaped with only one or two cases.

The port of Paita again suffered severely for a time, but vigorous measures were instituted, in the execution of which a goodly number

of houses were torn down and burned. And these efforts seem to have been crowned with some measure of success, no new case having appeared since February 27, of the present year. The sanitary condition of the town, however, still leaves much to be desired. President Pardo has recommended appropriations to give this port a drainage system, to pave and widen its streets, many of which are at present exceedingly narrow, and to make an up-to-date town of Paíta within six or eight years.

Piura and Querecotillo, towns on the railroad near Paíta, were newly infected; and San Geronimo, also newly infected this fiscal year, suffered severely. The epidemic in the latter place though, was short, lasting only from December to February. Among other towns, Catacaos and San Pedro were the most affected.

Although the plague extended somewhat farther from the coast this year than ever before, reaching Matacuna on the railroad from Lima in November, the interior towns as usual escaped infection. An epizootic among rats was reported from Arequipa, but would appear not to have been due to plague. In any event, the only human case officially known to have occurred in that city was imported from Mollendo.

Systematic vaccination against smallpox in the Peruvian Provinces, referred to in the last annual report, had unfortunately to be suspended, owing to lack of funds; and the prevention of smallpox was limited to the activities of the sanitary officers (physicians) stationed at various points. That disease, then, though it generally confines its ravages chiefly to the interior, became epidemic in Lima in July and continued so during that and the two ensuing months, causing many deaths. After September it was finally controlled by vaccination rigorously enforced. Comparatively few cases were heard of in the port of Callao.

In the early months of the calendar year there occurred an unusual outbreak of *verruca peruana*, noteworthy as taking place within 12 miles of Chosica, a locality in the valley of the Oroya line, but at an altitude of little more than 2,000 feet, and from which but very few cases have heretofore been reported. Some 12 or 14 Americans were employed in that locality to build a bridge on the railroad, and out of their number scarcely a man escaped infection by that loathsome malady. Many of the cases were exceedingly grave and a few deaths were recorded.

The occurrence was interesting in that the histories of the cases accentuated the extreme variability of the apparent incubation period of the disease, and as indicating the danger to which Americans expose themselves in accepting employment in the especial part of Peru.

RIO DE JANEIRO, BRAZIL.

Acting Asst. Surg. W. J. S. Stewart reports that during the year 218 vessels were inspected, of which 189 were steamers, and 29 were sailing vessels. These vessels carried 2,943 passengers and 8,036 crew. Bills of health were issued to these vessels, 78 being original bills, and 140 supplemental. The health conditions of the port showed a marked improvement over the previous year, but at the date of the report smallpox had prevailed for some time, and had already caused 3,908 deaths.

GUAYAQUIL, ECUADOR—QUARANTINE AND SANITATION.

On March 27, 1908, Passed Asst. Surg. B. J. Lloyd was appointed by the President of Ecuador as a member of a special technical commission to devise and enforce sanitary regulations for the suppression of plague in Guayaquil. On May 21, with the consent of the Secretary of the Treasury and the approval of the State Department, Doctor Lloyd was authorized to accept the presidency and direction of the said technical commission.

Doctor Lloyd reports for the fiscal year ended June 30, 1908, that bills of health were granted to 110 vessels, 109 of which were fumigated either to kill rats or mosquitoes, or both. The usual inspection of crews and passengers was maintained, many vessels being inspected both on arrival and departure. Immune certificates were discontinued on the appearance of plague, and passengers embarking from Guayaquil are subjected to three days' quarantine at Ancon, Canal Zone. Owing to the confusion that might arise in diagnosis, the vaccination of steerage passengers was also suspended.

Yellow fever and smallpox ran their usual course; the general conditions remained the same up to and including the month of January. The births in Guayaquil for the calendar year 1907 exceeded the deaths by only 19 (estimated population 70,000 to 80,000).

On February 6 Doctor Lloyd's attention was called to the fact that rats were dying in certain warehouses along the river front. On examination these rats were found to present the gross lesions of bubonic plague, and smears from spleens, glands, and other organs showed organisms morphologically identical with *B. pestis*. Feeling reasonably certain that they were plague infected Doctor Lloyd immediately wired the bureau, the chief quarantine officer of the Canal Zone, and, through Doctor Wightman, the Peruvian authorities, making a provisional diagnosis of plague. On behalf of the service Doctor Lloyd immediately began steps to complete the bacteriological examination, but shortly afterwards was commissioned by the governor, with Dr. F. Martinez S., to submit a report of the investigations for the Ecuadorian Government. On February 9, in consultation with a local physician, a clinical diagnosis of plague was made in a human subject. The usual denials were made by the press and by many prominent people, including some physicians. The patient died and the findings at the necropsy were so conclusive that none of the physicians present expressed a doubt as to the correctness of diagnosis. The American minister in Quito was kept informed of the progress of the work. On account of the persistent denials made to the general government, Doctor Lloyd was requested by the President, through the United States minister, to proceed with great caution. In order to strengthen Doctor Lloyd's position, Dr. Walter Kelton, chief surgeon of the Guayaquil and Quito Railroad, wired the United States minister that the diagnosis of plague was bound to be accepted sooner or later, and that the investigating commission had in hand everything necessary to convince anyone familiar with bacteriological methods. On February 13 plague was officially declared to exist; on March 7 a completed bacteriological report was transmitted to the governor confirming the existence of plague, but by this time the plague was epidemic. On February 14, at a mass meeting of prominent citizens, Doctor Lloyd was elected a member

of the technical commission which possessed advisory powers only; this commission accomplished nothing, and the work of combating the disease was divided between the board of health and a special administrative board. The situation was becoming more serious every day. On March 10 Surgeon Perry, Public Health and Marine-Hospital Service, arrived from the Canal Zone, and by invitation of the President he and Doctor Lloyd visited Quito for a conference, which resulted in their submitting a general plan for the sanitation of Guayaquil. Their report called attention to the fact that within one month there had occurred 60 cases of plague; that not only was the commerce of the Republic almost paralyzed, but the lives of its citizens were threatened as well. The difficulty of completely eradicating the disease was noted and the necessity for the cooperation of the people was emphasized. The President was advised to appoint a special commission to combat plague, yellow fever, and smallpox. This commission was to be composed of three men, one of whom was to be familiar with plague and with the handling of epidemics. The commission was recommended to have plenary powers and its work was outlined to include the following:

(a) The establishment of isolation hospitals for plague, yellow fever, and smallpox.

(b) A system of inspection was to be installed to discover cases of the three diseases mentioned.

(c) Disinfection of infected houses.

(d) Rat destruction.

(e) Mechanical cleaning.

(f) Destruction of mosquitoes.

(g) Condemnation of insanitary houses.

(h) Cutting doors and windows in dark and badly ventilated rooms.

(i) Education of the masses through the press and by circulars and through the clergy.

(j) The use of Haffkine's prophylactic.

(k) The fumigation of out-going vessels.

(l) Compulsory vaccination against smallpox.

(m) Isolation of persons suffering from plague, yellow fever, and smallpox.

(n) Prevention of reintroduction of these diseases from foreign and domestic cities and towns.

(o) The installation of a system for the disposal of sewage.

(p) Increase of water supply.

(q) Desiccation and drainage.

(r) Paving of streets.

(s) Sanitation of adjacent towns to prevent reinfection of Guayaquil.

Street paving, the increase of the water supply, and the disposal of sewage was to be given to a separate commission and a fairly effective system for the disposal of garbage was already in operation.

On March 24 an executive decree was given creating the Comisiona Especial de Saneamiento, consisting of Doctor Lloyd, Dr. F. Martinez S., and Señor Emilio Estrada, Doctor Lloyd being made president and director. Twenty thousand sucres monthly were allowed for the work (about \$9,470), out of which hospitals were to be maintained for plague, yellow fever, and smallpox. Buildings

for the isolation of these diseases were already under construction, but later it became necessary to spend a part of the funds of the commission to complete these buildings.

The commission was authorized to make such regulations as might be necessary to carry out its object, but no provision was made for the enforcement of these regulations. The municipality was unable to pass ordinances in accordance with the plan described. Taking advantage of the submission of the people on account of the semi-terrorized state induced by the progress of the epidemic, measures were enforced from dire necessity, but as yet the commission has not been able to punish directly for disobedience of its regulations. Physicians at first reported cases, but this practice was discontinued absolutely as soon as it was discovered that no penalty followed for failure to do so.

At the time that the commission was organized (March 27, 1908) plague was presenting at the rate of from 12 to 20 cases daily and there were about 120 cases under treatment. Work was continued for about one week along the lines already established, at the end of which time reorganization was effected. A force of about 150 men was employed, consisting of general inspectors, district inspectors, carpenters, laborers, office force, etc. The prices demanded by physicians for their services left them entirely unavailable as inspectors and medical students could not be had. During the first two months work was directed almost entirely against plague. Briefly, the organization of the work as it exists at the close of the fiscal year is as follows:

The city has been divided into ten districts, each under the supervision of a sanitary inspector, who has a force of one carpenter and two laborers. Their work is checked by the card system and by two general inspectors, and their duties are:

(a) To collect information.

(b) To distribute Danysz' and other classes of virus prepared by the commission.

(c) To cut holes in the double walls of the houses, and in ceilings, for the purpose of placing ordinary mineral poisons for rats.

(d) To cut permanent openings for light and air in dark and badly ventilated rooms.

(e) To empty and clean barrels and other receptacles which contain larvæ of mosquitoes. (Later, if authority can be obtained, these men will see that tanks, barrels, etc., are protected from mosquitoes. It is stated by Doctor Lloyd that work will be suspended unless proper sanitary laws can be obtained, together with the power to enforce them.)

(f) To place crude petroleum on pools, wells, and other places where larvæ may be found.

(g) To report sick.

In addition to the force thus employed there are squads for the fumigation of infected houses; squads for the mechanical cleaning of such houses after they have been fumigated, and special "flying" squads for urgent work of all kinds. All men on the force, whatever may be the nature of their work, are being trained in mosquito work, which they carry as a "side line" to their other duties. In addition there is a regular mosquito brigade, to cover such territory as can not be oiled otherwise; e. g., the district inspectors visit every place in their

districts once each month; three-fourths of the city at least must be covered at all times by the regular mosquito brigades. When the fumigating and cleaning squads are not otherwise engaged they are also pressed into this service. Special fumigators are employed for outgoing vessels.

The work of paving, disposal of sewage, and increasing the water supply is not in charge of the commission, and has not yet been begun; the condemnation of insanitary houses progresses slowly for the reason that it is not possible to condemn and disoccupy all such houses; the people have nowhere to go and nothing to provide themselves with, and the funds of the commission are not sufficient to care for so many. A number of the worst houses of small value have been condemned, and some have been repaired, and some pulled down. The diminution in the number of plague cases, undoubtedly due in great measure to the coming on of the dry season, has chilled the enthusiasm, and it is feared that the coming rainy season will find the people but little better prepared than before and that there will be a marked recrudescence of plague.

Aid of the press—common sense prophylaxis.—One of the daily newspapers has constantly aided in educating the public in sanitary work. After the disease had become epidemic the entire press began to cooperate. To the influence of *el Grito del Pueblo*, a daily newspaper, is attributed largely the sentiment in favor of inoculation with Haffkine's prophylactic. Circulars and posters were issued, advising the people of the conditions which favor the spread of plague and giving the best-known measures for avoiding the disease. Nurses, physicians, internes, laborers, etc., who have been in daily contact with plague cases but who have lived under good hygienic conditions have escaped. A rat died in the house occupied by Doctor Lloyd and a rabbit appeared ill and was taken to the laboratory and died a few hours later; although a complete examination was not made suspicious organisms were found. Many people in whose houses dead rats had appeared appealed to know what they should do, and were advised to disoccupy the infected house at once. If this were not possible, then to clean the houses mechanically, wash with lime or bichloride solution, clean out from under the floors, remove all garbage promptly, leave all doors and windows open as much as possible day and night, cut windows in dark and badly ventilated rooms, and if such rooms were still too dark not to sleep in them under any circumstances, but to sleep under a tree instead. In addition, they were advised to saturate the dead bodies of all rats found with kerosene and burn the surface and then burn the bodies in the street until totally incinerated. Floors were directed to be swept every day and mopped with kerosene; furniture to be rubbed off frequently with kerosene; as much sunlight and air as possible to be admitted into all rooms, especially sleeping rooms. Nearly all who followed this advice escaped in spite of the fact that rats were dying in their houses.

Use of Yersin's serum and Haffkine's prophylactic.—The physicians of Guayaquil almost as a unit advised the use of both Yersin's serum and Haffkine's prophylactic for purposes of immunization regardless of conditions, and for this reason many persons were so inoculated. Of those who were inoculated with both serum and prophylactic, Doctor Lloyd has reports on six cases that developed

plague shortly afterwards, two of which were fatal. Four cases of plague developed shortly after inoculation with the prophylactic alone, and two of these were fatal. Six persons developed plague from two weeks to two months after inoculation with the prophylactic alone, only one of which died. There were comparatively few cases among the inoculated, though the inoculations were made at the height of the epidemic. Recent investigations indicate that about 16 per cent (at least) of the population of Guayaquil have been inoculated with the prophylactic, some with, some without having had a previous injection of serum—altogether about 12,000 persons. Ignoring the cases which developed before inoculation began, the uninoculated have furnished 1 case for about 230 persons; the inoculated, 1 case for every 750 persons; but if we ignore the 4 who developed plague immediately afterwards the proportion is about 1 for every 1,000. These figures are subject to correction, though Doctor Lloyd believes they are not far wrong, and that he has erred on the conservative side. There were times when both serum and the prophylactic commanded fabulous prices.

The commission sold (at cost) 6,000 doses of Haffkine's prophylactic in one afternoon and could have disposed of ten times the quantity had it been available. Persons who were inoculated with both serum and prophylactic usually belonged to the better classes; servants and the poorer classes generally were inoculated with the prophylactic alone; after it was well established that the use of the prophylactic alone caused much less inconvenience than the use of both and was unattended by danger many prominent people received the prophylactic without the serum. Doctor Lloyd believes that the use of Haffkine's prophylactic is a valuable measure, but that it should be regarded as merely auxiliary to more important measures and perhaps even temporary. After a careful study of the results of the two substances as prophylactics he advises as follows: If infected rats or a human case occur in a house the occupants should be inoculated with not less than 10 grams of Yersin's serum and removed to a noninfected locality, the injection being repeated daily for three or four days; any time after seven days have elapsed from the time of removal from the infected house if plague has not developed, inoculate with Haffkine's prophylactic. If one can be reasonably certain that a house is not already infected, inoculate with the prophylactic alone and repeat after fifteen days. Two inoculations are probably better than one. So far no case of plague has occurred after a second inoculation, but there are perhaps less than 1,000 people who have been inoculated the second time. Doctor Lloyd inoculated himself with the prophylactic alone while attending a case of pneumonic plague and six weeks later repeated the inoculation and spent the greater part of the following three days in the lazaretto where there were 115 cases of plague under treatment. He does not believe there should be any hesitancy in using the prophylactic merely because the disease is present, even though epidemic; but he would exclude its use in infected house; if used in connection with Yersin's serum he prefers to do both inoculations at the same time. Unpleasant symptoms (urticaria, joint symptoms) seldom follow the use of the prophylactic alone; they are not uncommon after the use of serum and seem to occur more frequently if serum

is repeated after ten days have elapsed from the last injection of serum and possibly where serum is used some time after the prophylactic.

Curative effects of antiplague serum.—Cases of plague sometimes terminate abruptly when serum is given with the beginning of the initial symptoms, even when these are violent. Taking the cases (undoubted) in which serum was administered during the first twenty-four hours the mortality has been less than 15 per cent; cases not treated with serum have yielded about 55 per cent of deaths; after three or four days have elapsed before serum is given the death rate is 40 to 45 per cent. Not less than 20 grams of serum should be given every twelve hours, and double the quantity gives much better results; in severe cases give intravenously and without hesitation; operate on suppurating buboes (only).

Statistics.—The known deaths from plague which occurred from February 10 to June 30, 1908, are as follows: February, 33; March, 110; April, 123; May, 42; June, 14; total, 322.

The number of cases admitted to the lazaretto during the same period was 612, of which 263 died, or about 43 per cent. Many of these were treated without serum (in the beginning), others with an insufficient quantity, and still others with serum that had been stored for from one to two years or more. Many entered the lazaretto practically moribund and many others after three or four days of illness.

The exact number of cases will never be known. Estimating the total mortality at 43 per cent (Doctor Lloyd believes it to have been less) and adding 6 per cent for cases that were overlooked, there must have occurred about 800 cases during the period given. During the same time there were registered 72 deaths from yellow fever and 69 from smallpox.

At the present time it is absolutely impossible to judge whether the rapid decline of the epidemic is due to the measures installed or to the coming on of the dry season, though the decline began before the rains ceased.

In Huigra, Ecuador, from March 17 to June 20 there occurred 33 cases with 9 deaths; there were a number of suspicious deaths that were not investigated. There was also one death from plague in Milagro and one in Bucay in the month of June, reported by Doctor Kelton. The same measures were applied in Huigra as in Guayaquil under the direction of Dr. Walter Kelton, after conference with Doctor Lloyd.

In Huigra, Ecuador, plague appeared in the latter part of April and caused about 30 deaths. No case has occurred in Huigra since June 15. (Population, about 450).

HONGKONG, CHINA.

Acting Asst. Surg. J. S. Hough reports that during the fiscal year the operations of the service have notably increased. Smallpox and plague have been epidemic at the port, and cholera has from time to time been present. In addition to the former operations of the service, an examination has been made of all aliens departing from the port for the Philippine Islands. Moreover, at the request of the consul-general of the Republic of Panama, 221 passengers destined for that country have been examined and 80 have been rejected.

During the year 426 steamers and 5 sailing vessels have been inspected, and 25 vessels have been disinfected prior to sailing.

Crews of these vessels to the number of 39,657 have been examined, and of these 29,480 have been bathed and their dunnage disinfected. Passengers to the number of 16,648 have been inspected, and the effects of 7,480 disinfected. Five passengers were rejected, as suffering with fever at the time of embarkation. Forty-six pieces of baggage have been inspected and passed, and 36,101 pieces have been disinfected. In the matter of cargo, 978 packages have been stored to comply with the provisions of the quarantine regulations, and 883 packages have been disinfected.

Aliens to the number of 6,593, destined for Honolulu and ports on the Pacific coast of the United States, have been examined, and 2,458 have been certified; 961 aliens destined for the Philippines have been examined and 494 rejected. Of the number bound for the United States and Hawaii, 2,458 rejections were for trachoma and 2 for scabies.

SHANGHAI, CHINA.

On August 8, 1907, the services of a medical officer attached to the consulate at Shanghai were discontinued, and the incumbent, Acting Asst. Surg. S. A. Ransom, was transferred to the American consulate at Kobe, Japan.

On September 29, 1908, owing to the reappearance of plague and cholera in the Shanghai consular district, Doctor Ransom was reappointed an acting assistant surgeon in the service, and reassigned to duty in the Shanghai consulate.

YOKOHAMA, JAPAN—QUARANTINE AND SANITATION.

Passed Asst. Surg. Hugh S. Cumming reports in part as follows for the fiscal year ended June 30, 1908:

Steam vessels inspected and granted bills of health	235
Sailing vessels inspected and granted bills of health	12
War vessels granted bills of health without inspection	9
Total bills of health granted	256
Saloon passengers upon the above vessels inspected	5,445
Steerage passengers upon the above vessels inspected	25,646
Crew upon the above vessels inspected	31,646
Persons required to bathe and undergo special inspection	7,283
Pieces of baggage disinfected under supervision of this service	13,242
Aliens, would-be steerage passengers specially examined for the United States immigration service for other than quarantinable disease	6,869
Persons passed as free from such disease	5,075
Persons certified upon the ships' manifests	4,688
Vessels fumigated in whole or partially to kill vermin	43

One vessel was held pending diagnosis of case and one case of quarantinable disease detected upon inspection.

Plague is a serious menace to the whole world and the most difficult of all quarantinable diseases to control and confine; Yokohama is the terminal point of many steamers trading from Atlantic ports to the Orient, and whenever practicable these vessels are fumigated here, even if they be sailing via pest-infested ports en route. Case after case has occurred to show that the incubation period of absence from any known source of infection has little to do with the danger

of a vessel, the important thing being the presence of the infection among vermin on board.

Fumigation of all vessels bound for the Philippine Islands is done whenever the vessels are empty and have been exposed, and in the case of the passenger line from here to Manila and Australia disinfection throughout is required each trip.

The treatment of all steerage passengers and members of crews embarking here continues the same, all being bathed and their effects disinfected unless their antecedents are personally known to this office, and all steerage passengers from cholera or plague infected districts are detained here for observation during the incubation period of the disease.

This office requires that all consular invoices and boat notes shall be presented except for silks and similar goods, as a consequence of which, while it entails much labor and time, absolute check is kept upon freight to the Philippines, Hawaii, and the United States. In the case of foodstuffs and plants satisfactory evidence of origin is required and manifests are certified as well as individual boat notes. Check is also kept upon supplies for vessels.

Sanitary conditions—Empire of Japan—The year has been marked by two of the severest epidemics known here for many years—one of cholera and one of smallpox, with a third epidemic in Osaka and several other towns—of plague.

Cholera.—Shanghai is one of the two worst cholera centers in the world; last year the disease began earlier than usual, and with greater virulence, immediately spread to the foreign concessions and shipping, and in a short time the disease appeared in Nagasaki, Japan, in the persons of two English gentlemen who traveled saloon and had just landed.

Like a smoldering fire it suddenly broke out in a severe epidemic at Moji-Shimonoseki, the great coaling port at the entrance to the Inland Sea, the gateway to all Japan from the East and naturally rapidly worked its way to all the southern ports and kens and, despite energetic and intelligent work of the sanitary authorities, the official report for the middle of November showed 2,758 cases and 1,873 deaths.

The disease gradually ceased in epidemic form, but occasional cases have been reported all winter in the rural districts around Tokyo. It is interesting to note that although Nagasaki was one of the first communities infected, and its water supply not above reproach, no cases were reported there after the first outbreak.

Smallpox.—This disease here is always present in sporadic form in the rural districts, but during December there began in Kobe the most fatal and severe epidemic for many years.

Most of the people attacked and nearly all of the deaths were in nonvaccinated people or those who had not been revaccinated, and the epidemic was a costly and sad lesson upon the danger and folly of neglecting the rigid enforcement at all times of vaccination laws.

The official statistics show a total to the end of May of 17,401 cases, with 5,763 deaths from this disease.

Plague.—Osaka, the great manufacturing city, with its canals, slums, and poverty unlike any other Japanese community, is an endemic center of plague, and is also repeatedly reinfected by cotton and rice from India.

So thoroughly infected did the authorities consider it that the municipality practically said that it could do nothing on account of the cost, and consequently financial and scientific help has been furnished by the Imperial Government, whose experts estimated that it would cost 1,200,000 yen to clean up the city. On account of the proved danger, the Government gave notice of disinfection before unloading of all cotton and rice vessels from India.

A small epidemic occurred upon an island near Nagasaki, which was traced to old quilts (futon) from the naval station at Saseho, where the authorities burned about 160 houses to get rid of a persistent infection. From Osaka plague has spread to Nushima, a small island near Awaji, and inland to Nara, one of the old capitals of the Empire. In November the high industrial and 18 primary schools were closed in Osaka as a consequence of the epidemic.

Leprosy.—This disease, which history has shown can be practically eliminated gradually from a country by intelligent effort, is still being neglected, the authorities for lack of funds having postponed for another year the erection of the five or six isolation hospitals provided for by law which was to have gone into effect this April (1908). And while the disease was in May declared quarantinable the victims may be seen any day upon the streets of this city. From statistics already forwarded it may be seen that with 37,431 leper beggars frequenting temples and public places and 6,877 having fixed homes, yet too indigent to receive treatment, this disease is a serious menace in the Empire of Japan.

Dysentery.—In contrast to the attitude of the Government toward leprosy is the severe attitude toward dysentery, epidemics of which have been reported during the year at Hachioji (silk district), Shidzuoka, Uji, Ushigome, Koishigawa, and upon the battle ship *Mikasa*. Official returns for the year ended May 31, 1908, are, cases 330, deaths 49 for the Empire.

Typhoid fever.—Epidemic was reported at Kure naval station upon the battle ships *Fuji*, *Kasuga*, *Tokiwa*, and the official returns for the year ended May 31, 1908, show for the Empire: Cases, 4,725; deaths, 1180.

Tuberculosis.—The disease is not among those notifiable and classed officially as contagious and there are no official returns as to the cases or deaths from tuberculosis, but there are intelligent laws which virtually class it among the dangerous contagious diseases and require the use of spittoons in hospitals and public places, specify the use of water or disinfecting fluid to prevent drying of sputum in the receptacles, laws requiring segregation of patients in hotels, watering places, hospitals, etc., and the disinfection of rooms and bedding used by those "known or suspected of being tubercular."

Provision is made for the inspection of milch and beef cattle, the use of tuberculin for diagnostic purposes, and providing compensation for property and cattle destroyed under this law.

In the village of Hishima, near Osaka, it is reported that 1,000 of the 5,000 inhabitants are infected, and an average opinion would seem to be that about 18 or 20 per cent of deaths are due to this destroyer.

Beriberi or kakke.—While there are no statistics available, the disease is still extremely common here. All laymen know the signs, and an imperial commission headed by the surgeon-general of the

army has been recently organized to study and report upon its prevalence and prevention.

Trachoma.—This disease is still a scourge, and the Imperial University has just started a special course of lectures upon trachoma.

Rinderpest and rabies.—These diseases have recently been reported epidemic in Shimonoseki and Tokyo, respectively.

Cerebro-spinal meningitis.—Severe epidemics have occurred in Sakai, a manufacturing city on Osaka Bay, and in Tokyo in September, where the authorities issued a circular warning about its nature, the contagiousness of the secretions, etc.

Sanitary conditions in Yokohama.—The population of this city, according to the police census December 31, 1907, was 378,884, living in 74,572 houses, an increase of 29,022 since the census of 1906. The registered births were 8,201 and the deaths 5,411. These figures show an annual death rate of 14.28 per mille as compared with 11.12 for 1906 and 12.70 for 1905. The increase may fairly, I think, be attributed to the two epidemic diseases, cholera and smallpox.

The official report as to contagious diseases shows for the year ending June 30, 1908:

	Cases.	Deaths.
Cholera	77	66
Smallpox	424	142
Typhoid fever	199	60
Scarlet fever	22	6
Diphtheria	207	54
Plague	3	2
Dysentery	95	8
Total	1,027	338

Plague.—The fiscal year began with infected rats being found in many places and the outlook bad, but energetic work by the authorities and a prompt appropriation of about 60,000 yen (\$30,000) soon choked the outbreak until a few weeks ago, when six infected rats were found in the suburbs distant from the water front.

Fumigation of rice and cotton vessels is carried out previous to discharging, and in one case where infected rats were found the rice was traced out and disinfected.

Cholera.—The first case here appeared upon a vessel from Shanghai via Kobe, three of the crew having died and two recovered. This outbreak had been preceded by an apparently innocent diarrhea for some time among all of the crew. No local cases followed.

September 1 a vessel arrived from Neuchwang and about 156 passengers came ashore. The next day the freight clerk died of cholera. September 13 two sampan boatmen and the wife of one of them were attacked, and the same day a public bath attendant. The disease occurred chiefly among those people at Kanagawa who ate a certain sort of raw fish, never attained much headway, and died out, the last case being November 16, 1908, though a case is occasionally reported in the rural districts around Tokyo.

If the one case reported in Honolulu was cholera, and some doubt is, I am told, attached to the diagnosis, it undoubtedly originated in Kobe or Shanghai, in both of which places it was raging violently.

Smallpox.—The first case here was an American sailor who walked into this consulate with a confluent form in the pustular stage.

The disease persisted until April, and precautions as to vaccination of personnel were taken by this office throughout the epidemic.

During both the cholera and smallpox epidemics intercourse between vessels and shore was reduced to a minimum, and during the former epidemic food supplies were closely watched.

The comparatively large number of vessels fumigated here (43) without apparatus or help and often by the manual labor of the medical officer, together with the supervision of freight, actual inspection of vessels, and immigration work, makes this station one which fully occupies all of the time and energy of the medical officer in command.

KOBE, JAPAN.

Acting Asst. Surg. S. A. Ransom reports in part as follows on the transactions at this station covering the period from August 20, 1907, to March 25, 1908:

No records or statistics of any kind being turned over by Dr. J. B. Fowler, on being relieved, no report is made for the period July 1, 1907, to August 19, 1907. It may be mentioned, however, that from July 1, 1907, to August 20, 1907, there were issued 28 supplemental and 5 original bills of health to 33 steamers with an aggregate of 146 cabin and 712 steerage passengers.

The work of the station has involved the inspection of vessels in the bay, and the disinfection of those requiring it; the inspection of freight and a supervision of the disinfection of so much as requires it; the examination of aliens for diseases constituting a bar to landing in the United States under the immigration laws, with particular reference to trachoma, favus, and tuberculosis; the bathing of all steerage passengers sailing from this port on vessels bound to the United States or Philippine Islands, and the disinfection of their effects.

The actual work of disinfection is performed by Dr. A. G. Boyer, who has for some time been engaged in this business under contract with the various shipping concerns and whose services have been thoroughly satisfactory, but close personal supervision has been given to see that the requirements were fully met, and that the disinfection was effective.

The inspection and disinfection of freight involves visits to various parts of Kobe and Hiogo, but the distances to be traveled are not great. Steamers undergoing disinfection in the bay frequently require several visits besides that necessary for their inspection immediately before sailing, but here again the distances are not very considerable, and steam launch service has generally been provided by the agents of the lines interested.

The examination of aliens, practically all Japanese, and the bathing and disinfection of steerage passengers has been conducted at Ono, and it has frequently been necessary to make two or three trips to this place on a single day. At Ono are located also the detention barracks recently constructed for use during the prevalence of cholera or plague at this port, and during the time that intending passengers are isolated there, at least one trip was made each day for the purpose of inspecting such passengers.

In the beginning a great deal of friction was encountered with relation to the enforcement of any and all quarantine and emigration

regulations, but this has been overcome. The emigration brokers constitute a powerful faction in Japan, having a considerable representation in the central government, and need to be dealt with judiciously. Firmness is, however, essential, as is also a careful supervision to see that the requirements are fully complied with, for there is a marked tendency on the part of these brokers to take advantage of the slightest opening to evade the rules laid down. Substitution is one of the principal evils, and one most difficult to deal with. It has been found that persons with normal eyes, and not intending to take passage, have been submitted for examination, while the real passenger and holder of the ticket and passport was suffering from severe trachoma, and substitution was carried out between the time of examination and shipment, until the present system of strictly separating the emigrants passed from all other persons was placed in operation. But it is not alone at the port of original examination that this practice is carried on, as passengers placed on board here and leaving on the steamers, are at times replaced at subsequent ports of call, Moji, Nagasaki, or Yokohama. This form of substitution it is almost impossible to prevent. Direct substitution in Kobe is reduced to a minimum by the scheme adopted here to separate passed and rejected emigrants, and this seems to be supported by the fact that out of 4,660 emigrants passed only 30 are known to have been sent back from the port of landing.

The supervision of freight from Kobe to ports in the United States and Philippine Islands is maintained at all times by requiring that ships' manifests be submitted to this office for approval and countersignature, such signature being refused when there are found entered on the manifests articles of a nature liable to convey infection and which have not been disinfected under the supervision of this office. During the prevalence of cholera or plague shipping orders are also required to be countersigned before presentation at the ship's side with cargo. These shipping orders are examined at the time of inspection immediately before the sailing of the vessel, and any found not signed are noted on the bill of health for the information of the quarantine officer at destination. During the prevalence of either of the diseases above mentioned shipping orders are stamped "Not to be taken on board without the signature of the U. S. quarantine officer." When it is considered that over 1,200,000 packages of freight, aggregating more than 108,000 tons, have been shipped from this port since August 20, 1907, it will be appreciated that the signing alone of manifests and shipping orders is a considerable task and occupies much time. In addition, freight deemed to require it is inspected before the shipping order is signed.

It is fortunate that practically no freight of a dangerous nature, except vegetables for Manila and a few packages of human hair, is shipped from this port to the United States. The latter has been invariably disinfected with formalin, and the former is required to be accompanied by satisfactory certificates of origin before being passed. Some 1,160 bales of wool, transshipped from China, have been disinfected here.

Bills of health have been issued to 132 vessels since August 20, 1907, of which 118 were supplemental and 14 original, all of the vessels to which they were issued being inspected as near as possible to the hour of sailing.

The inspection as carried out here includes the entire crew and all passengers except cabin, and even the latter from Kobe are included in the inspection during the prevalence of cholera, plague, or small-pox. During the prevalence of these diseases communication between the vessels and shore is discouraged, and the shipping people are requested to absolutely prohibit the Asiatic personnel of vessels bound to the United States or the Philippine Islands from landing, and also to prevent peddlers from gaining access to the ships. But this office is not able to effectively enforce these requirements or maintain supervision over the cargo coolies as was desired.

There have been disinfected at this port since August 20, 1907, 18 vessels. These disinfections have been mainly to kill vermin, and were carried on with sulphur dioxide generated by burning lump sulphur in iron tea-firing pans, large shallow vessels, which lend themselves to the work very well. Three pounds of sulphur, ignited by wood alcohol, have been burned to each 1,000 cubic feet of cargo space, the exposure being 12 hours for iron vessels when entirely empty. As stated, this work is performed by Doctor Boyer, who supplies the labor and material under contract with the shipping people, and charges, I believe, 2 sen per net ton of cargo space. The whole process is carried on under immediate supervision. Many dead rats have been found on a number of vessels.

Disinfection of vessels with sulphur is usually required of vessels making this their original port of departure for any port under American jurisdiction. Quite recently, however, it has been suggested by the chief quarantine officer of the Philippine Islands that vessels bound from Japanese ports to Manila, when producing a recent certificate of fumigation from the quarantine officers of Australia, be exempt from this procedure here, and as such vessels invariably lay in the open bay at Kobe, his suggestions have been followed.

When vessels are fumigated with sulphur, or when the crews are bathed and disinfected, the forecastles are thoroughly cleaned mechanically and then washed down with a solution of bichloride of mercury, 1:800.

The number of crew bathed and effects disinfected here since August 20, 1908, was 896. This is required of vessels making this their original port of departure for the United States, etc., and of vessels bound hence direct to the United States or Philippine Islands, but practically none have been treated for the latter reason, as nearly all go via other ports—Hongkong, Nagasaki, Shanghai, Yokohama, etc. It is also required, of course, of vessels which have had quarantinable disease on board here.

The crews are landed as near as possible to the disinfecting plant, where they are bathed with hot water and soap, followed by a weak disinfecting bath, their effects, including all bedding and clothing, steamed, and the whole then immediately placed on board. This is done as near as possible to the hour of sailing.

There have been bathed and had their effects disinfected at this port since August 20, 1907, 5,810 steerage passengers. During the prevalence of cholera all such passengers as sail from Kobe on vessels bound to the United States, etc., whether they are destined for such port or for an intermediate or subsequent port, are bathed and have their effects disinfected, and are held five days under observa-

tion at the detention barracks. For plague the detention is seven days, and at the present time all passengers from Osaka are required to undergo that period of observation.

In the absence of either of these diseases or other quarantinable disease requiring detention, steerage passengers are required to present themselves at the disinfecting station twenty-four hours before sailing, when they are bathed with hot water and soap, followed by a mild disinfecting bath, their clothing and all other effects disinfected by steam as far as possible or by formaldehyde or sulphur gas, and detained in the barracks until the hour of sailing of their steamer, when they are placed on board direct from the plant with their disinfected effects which have, in the meantime, been stored in a go-down at the plant. Access of friends or egress of the passengers is absolutely prohibited, and in case this rule is transgressed the passage is canceled. During the prevalence of smallpox all steerage passengers are vaccinated prior to being admitted to the detention compound.

In the examination of aliens—Japanese—bound to the United States there are several difficulties to be surmounted. By far the greater majority of emigrants for Canada take passage on steamers whose ultimate destination is the United States, and for that reason are bathed, disinfected, vaccinated, and held under observation, etc., in the same manner as those for the United States, and in the same compound. By reason of the requirements for Canada as regards trachoma, favus, etc., being less stringent than those for the United States, a majority of the passengers rejected by me for these diseases are passed by the physician examining for Canada, with the result that they gain access to the detention compound and constitute more or less of a menace to those who have passed as free from these diseases. I am told that over 50 per cent of these people who go to Canada eventually find their way into the United States.

The authorities here are at the present time giving closer attention to investigating and issuing passports, so that passengers for Canada may not for the time being find it so easy to enter the United States.

Another difficulty encountered is that of aliens rejected at Nagasaki and Yokohama presenting themselves here for examination, and those rejected here going to one or the other of the ports mentioned to endeavor to pass. It is believed that but few of them get through, but there is at least one case which was rejected eight times for severe trachoma, and within a week of the last rejection the man was seen as a passenger on a steamer bound for Honolulu, though how he had succeeded in getting certified is not known, unless it was by means of substitution. To assist in obviating this difficulty it has been suggested that an interchange of the rejection lists between this and other ports in Japan should be made, and this plan is already in operation between here and Yokohama.

The examination of aliens desiring to take passage from this port to the United States or Philippine Islands is made at Ono, where there is at the present time a very efficient disinfecting plant, fitted with chambers for disinfecting by superheated steam, and also with facilities for using sulphur or formaldehyde gas as disinfectants. There are ample facilities for bathing, and barracks for isolating those passed.

Intending passengers are assembled in a large, well-ventilated room, and before the examination is commenced all means of access

from the outside are closed and locked. There is immediately adjoining this a well-lighted room where the examinations are conducted, the passengers entering by a door directly in front of the examining officer. Those passed are turned to the right, whence they pass immediately into the undressing room to prepare for their baths, their clothing being removed and placed in the steam chambers, where it is exposed to flowing steam for ten minutes and to steam under pressure for thirty minutes, and then conveyed to the dressing room at the "clean end," where the passengers assemble after their bath. After clothing themselves, the passengers are conducted to the detention barracks, constructed for the purpose on the same premises and affording accommodations for 250 adults in 11 rooms. There is an ample yard or compound connected with the barracks, affording facilities for exercise and fresh air, and in addition there are covered verandas running the length of each building and connecting with every room. The passengers detained for observation are separated as nearly as possible into groups of 25, each group being assigned a separate room.

In a separate building are located the kitchen and dining room, and between this and the barracks proper is the washroom. The water-closet, which is entirely inclosed and of the dry-closet type, is located about 100 feet from the barracks and other buildings.

The floors of the rooms in the barracks are covered with heavy Japanese mats, and bedding is supplied by the owners of the plant for use of passengers while in detention. There is no other furniture or hangings in these rooms, they being furnished in Japanese fashion, and the bedding and mats are disinfected by steam after use by each set of passengers, while the rooms are sprinkled with a carbolic-acid solution.

The baggage of those who have been passed by the inspecting officer, aside from the suit of body clothing worn, is, after disinfection by steam or gas, stored in a godown on the premises until the passengers are sent on board, the baggage being sent to the steamer at the same time. When the detention lasts over twenty-four hours, a daily inspection of all persons held in isolation is made, and any case of sickness of a suspicious nature is at once isolated in the hospital on the premises for further observation. No case of quarantinable disease has developed among those in detention, but in case of such an occurrence, the group of 25 in the room from which the case was removed would be isolated from the remaining persons in detention and again bathed and disinfected.

No access to the detention compound is allowed to any but employees and emigration brokers (who must be admitted from time to time on account of their business relations with the passengers), and all of these are required to wear in a conspicuous place a distinctive badge, showing to what class they belong, issued and countersigned by this office. A list of all such badges issued is kept in this office, and they are canceled for any infraction of the rules laid down by me. A strict but unoppressive discipline is maintained at the plant, and absolutely no complaints or trouble have arisen, except in a single instance when a rough endeavored to force his way into the compound and was killed by the guard.

The owners of the plant are responsible for carrying out orders issued to them, and they maintain discipline among their subordinates.

During the maintenance of isolation, all employees of the plant are, as far as possible, required to live on the premises, but where this condition can not be met, they are required to undergo the same bathing and disinfection of their clothing each time they return from the outside as the passengers are submitted to before entering the compound.

The only thing that prevents the plant from being an ideal one is the fact that it is not directly on the water front, passengers having to go through the street for a little more than one block to board the tender conveying them to the ship, but this trip is made under police supervision, and is, it is believed, free from any very material drawbacks.

By using all of the available space at the plant, about 500 persons can be isolated comfortably.

Intending passengers who fail to pass the immigration examination are turned to the left in the examining room, whence they go by a separate passage directly outside the compound and are not permitted to enter again during the progress of that examination.

Strict police supervision over the whole process of examination and placing the passengers on board their steamers is maintained, and has been of considerable assistance. Passports are examined by the water police on the day prior to the examination, and police officers are on duty at the plant to check up the passed and rejected emigrants, which aids to some extent in preventing direct substitution.

The above conditions present a striking contrast to the process formerly in vogue here.

Intending passengers rejected at one examination invariably present themselves at the next several succeeding examinations, and this has led to an exceedingly large percentage of rejections for those examined, and also to the supposition that trachoma is more prevalent among the Japanese than it really is. It has now been arranged so that those who have been rejected upon former occasions are examined separately from those who present themselves for the first time, with the result that the percentage of trachoma found in the new cases is only about 33, while before this arrangement was made the rejections amounted to 49.4. All of the rejections except 2 cases of syphilis and 4 cases of favus have been for trachoma. About 15 per cent of those rejected or advised to wait and who present themselves for a subsequent examination are found to have improved sufficiently to be passed.

Trachoma as found among the Japanese who have presented themselves for examination (9,008) seems to affect over 49 per cent. The disease is particularly prevalent among those from Hiroshima Prefecture, who show over 45 per cent of all rejections, while 35 per cent of all examined are from this section. Yamaguchi, which supplies 12 per cent of those examined, is the next in line with over 20 per cent of rejections, while Okinawa (Loochoo Islands) with 20 per cent of all examined has less than 10 per cent of those rejected. This is more or less remarkable in view of the fact that the people who come from this section are of the lowest class of emigrants and intensely ignorant.

The following is the percentage of emigrants for America from the different prefectures, who present themselves at Kobe for examination :

	Per cent.		Per cent.
Hiroshima -----	35	Shiga -----	3
Okinawa -----	20	Kumamoto -----	3
Okayama -----	15	Fukuoka -----	3
Yamaguchi -----	12	Miye -----	1
Wakayama -----	8		

It has been found difficult at times to differentiate between follicular conjunctivitis, mucoid cysts of the conjunctiva, and true trachoma. But all persons presenting suspicious symptoms are required to wait over several days so that the effect of treatment may be observed. True trachoma seems to improve slowly or not at all with ordinary treatment, while the other forms of disease of the conjunctiva progress rapidly toward a cure.

Experience with over 4,000 cases of trachoma shows that the disease affects both eyes in a majority of the cases; that when one eye alone is affected the left suffers about twice as often as the right. Both eyes are affected in about 60 per cent of the cases, the left eye alone in about 25 per cent and the right eye alone in 15 per cent. The upper lids only are affected in a large majority of the cases, about 70 per cent, both lids in some 25 per cent, and the lower lid only in about 5 per cent. Women and children suffer from trachoma to a greater extent than men, showing the following percentages for each class examined: Women, 52.7 per cent of all examined; children, 52.7 per cent of all examined; men, 43.3 per cent of all examined.

When the upper lid is slightly affected, the granulations are usually most abundant in the fold behind the cartilage near the inner canthus, the conjunctiva over the cartilage being affected only in the more severe cases. To find these granulations it is necessary to completely turn out the sac.

When the lower lid is attacked by a moderate or slight case, the granulations have been found generally situated near the outer canthus.

Considered from the standpoint of Europeans' eyes, a normal eye is rarely met with. There is seen practically always more or less congestion of the conjunctiva and also a good deal of true inflammation that is not due to trachoma, hence to a beginner the examination of eyes at this port presents more than the ordinary difficulties. The small charcoal fires over which these people sit during the cooler weather, with their faces close to the heat and gases is, it is claimed, one fruitful source of the conditions mentioned.

As to the cause of the prevalence of trachoma among the Japanese, nothing definite is known. Japanese physicians have suggested that it may be due to dust from dry human excreta used as fertilizer, but this would hardly explain why it should flourish in one section more than another, while the conditions in this respect are alike in all. Certainly the chronic inflammations of simple character above referred to create a favorable nidus for any specific infecting organisms that may be conveyed to the eyes by the careless handling of towels and utensils infected with the discharges of trachomatous eyes, and in this I think the Japanese are not over careful in the public baths or in their own homes.

During the present year Kobe has hardly sustained its claim to being a healthy port, it having been visited by two epidemics, one of

cholera commencing last August and continuing with considerable severity through September and October, the disease gradually declining in November and ceasing altogether in December. There were during this epidemic, according to official reports, 472 cases. The disease was quite prevalent among the water-front population, and in this connection the report of a bacillus resembling cholera recently found in Kobe Harbor, and mentioned to the bureau in my weekly report, may be of some interest.

The epidemic of smallpox in Kobe began in August, although the disease did not assume any considerable proportions until well along in November. The epidemic was very severe until the latter part of February but has declined recently, so that on some days no new cases are reported, the average being now about 3 new cases per day. Of this disease there have been reported officially since the beginning of the outbreak 6,166 cases. The original case was traced to two Chinese children from Shanghai who landed here on August 17 and died on the 23d and 24th of severe smallpox. Cholera was also imported, it is claimed, from Shanghai, and this seems probable, as the epidemic was in full swing there a considerable time before it appeared here.

Notwithstanding the severe epidemics above alluded to, but one case of quarantinable disease, smallpox, on the schooner *Talbott*, December 7, 1907, has appeared in this port among the vessels bound hence to the United States.

The water supply of Kobe is obtained from a watershed high up on the mountains back of the city, and seems good, although it is a noticeable fact that newcomers invariably suffer from diarrhea of a more or less severe character. The means of conveying water to the shipping at this port is, however, open to serious objections. It is towed out in wooden lighters and pumped on board by a water boat, but the lighters have large hatches which are always removed to admit the suction hose. The contamination, therefore, of a ship's water supply, through carelessness or a case of cholera among the crew of the water boat or lighter, would be a very easy matter. The water supply is in the hands of the local officials.

NAGASAKI, JAPAN.

Sanitary Inspector R. I. Bowie reports for the fiscal year ending June 30, 1908:

Total number vessels examined, 100; passengers, 25,339; crews, 17,915.

Nagasaki has been fortunate in that only sporadic cases of any of the quarantinable diseases have been discovered, each instance being traced to importations from other ports.

The exodus of immigrants from this port shows a large decrease as compared with previous years, at present the average number of applicants for examination being about 25 for each steamer.

CALCUTTA, INDIA.

Acting Asst. Surg. O. M. Eakins reports: During the fiscal year 47 vessels were inspected, with 2,709 crew, and the personal effects of 1,705 members of such crew were disinfected in accordance with the quarantine regulations.

MEDICAL INSPECTION OF IMMIGRANTS.

During the fiscal year ending June 30, 1908, 935,597 immigrants were examined by medical officers of the service to determine their physical fitness for entrance at ports in the United States and its dependencies, Porto Rico, Hawaii, and the Philippines. Sixteen commissioned officers and 35 acting assistant surgeons were assigned to this duty exclusively, and a large number of officers, primarily engaged in other service duty, examined aliens whenever presented to them. During the fiscal year 10,902 aliens were certified for physical reasons. The officers of the service stationed at the consulates for quarantine duty in Italy, Japan, and China also inspected departing aliens at the request of the Department of Commerce and Labor; this work at some ports exceeding in volume and difficulty the quarantine function.

As in previous years the function of the officers at foreign ports is advisory to the transportation companies, and the number of undesirable emigrants reported to have been refused on the advice of these officers bears testimony to the value of the work.

Following is a summary of the transactions at the several ports:

Astoria, Oreg.—Passed Asst. Surg. J. M. Holt reports that a total of 2,833 aliens was examined, of whom 36 were certified. Among the causes for certification were 5 for trachoma and 4 for syphilis.

Baltimore, Md.—Surg. L. L. Williams reports that 32,309 aliens were examined, and 571 were certified. Four hundred and twenty-two aliens were treated in hospital.

Bellingham, Wash.—Acting Asst. Surg. L. R. Markley reports that 68 aliens were examined, of whom one was certified.

Boston, Mass.—Surgeon Williams reports that 52,612 aliens were inspected, and 567 certified. Among these were 11 for trachoma, 3 for favus, and 2 for tubercle of lung.

Brownsville, Tex.—Acting Asst. Surg. Geo. D. Fairbanks reports that 1,184 aliens were examined, of whom 167 were certified. Among these were 107 for trachoma and 6 for tuberculosis.

Buffalo, N. Y.—Surg. D. A. Carmichael reports that 3,352 aliens were examined, and 76 certified. Among these were 56 for trachoma and 2 for favus.

Charleston, S. C.—Acting Asst. Surg. F. F. Sams reports that 11 aliens were inspected.

Detroit, Mich.—Surgeon Woodward reports that 2,323 aliens were inspected, of whom 48 were certified for trachoma, favus 1, and tubercle of lungs 3.

Douglas, Ariz.—Acting Asst. Surg. F. T. Wright reports that 434 aliens were inspected and 14 certified, among these being 10 for trachoma.

Duluth, Minn.—Acting Asst. Surg. E. L. Cheney reports that 5,402 aliens were examined and 83 certified.

El Paso, Tex.—Acting Asst. Surg. J. W. Tappan reports that 23,306 aliens were inspected and 173 certified, among these being 21 for trachoma and 2 for tuberculosis.

Everett, Wash.—Acting Asst. Surg. J. Chisholm reports that 228 aliens were inspected.

Honolulu, Hawaii.—Passed Asst. Surg. L. E. Cofer reports that 10,246 aliens were inspected and 107 certified, among these being 90 for trachoma and 2 for tuberculosis.

Key West, Fla.—Acting Asst. Surg. J. N. Fogarty reports that 1,792 aliens were examined, of whom none were certified.

Laredo, Tex.—Acting Asst. Surg. H. J. Hamilton reports the examination of 3,617 aliens, of whom 160 were certified, including 44 for trachoma.

Malone, N. Y.—Acting Asst. Surg. E. W. Hill reports the examination of 950 aliens, of whom 16 were certified, including 4 for trachoma.

Marcus, Wash.—Acting Asst. Surg. Thomas F. Parker reports the examination of 1,887 aliens, of whom 130 were certified.

Naco, Ariz.—Acting Asst. Surg. B. C. Tarbell reports the examination of 2,100 aliens, of whom 18 were certified, among the causes being 12 for trachoma and 1 for tuberculosis.

New Orleans, La.—Acting Asst. Surg. J. T. Scott reports the examination of 8,034 aliens, of whom 320 were certified, among the causes being 12 for trachoma and 2 for tuberculosis.

New York, N. Y.—Surg. George W. Stoner reports the examination of 689,474 aliens, of whom 7,216 were certified, among the causes being 860 for trachoma, 32 for tubercle of the lung, 68 for favus.

Nogales, Ariz.—Acting Asst. Surg. A. L. Gustetter reports the examination of 437 aliens, of whom 3 were certified, 1 each being for trachoma, tuberculosis, and senility.

Philadelphia, Pa.—Passed Asst. Surg. Taliaferro Clark reports the inspection of 17,107 aliens, of whom 696 were certified, including 27 for trachoma and 3 for favus.

Philippine Islands.—The chief quarantine officer for the Philippines reports the inspection of 7,864 aliens, of whom 51 were rejected for physical causes.

Port Huron, Mich.—Acting Asst. Surg. R. H. Rea reports 3,548 aliens inspected, of whom 68 were certified, including 3 for trachoma and 5 for tubercle of the lungs.

Porto Rico—San Juan.—The chief quarantine officer for Porto Rico reports the inspection at San Juan of 2,144 aliens, of whom 4 were rejected.

Richford, Vt.—Acting Asst. Surg. J. H. Hamilton reports that 166 aliens were examined, of whom none were certified.

San Diego, Cal.—Asst. Surg. E. A. Sweet reports the inspection of 38 aliens, of whom 5 were certified, 3 of the number being for trachoma.

San Diego quarantine, Cal.—Acting Asst. Surg. W. W. McKay reports the inspection of 587 aliens, of whom 1 was certified for tubercle of the lungs.

San Francisco, Cal.—Passed Asst. F. E. Trotter reports the inspection of 13,000 aliens, of whom 1,910 were certified, including 479 for trachoma.

Sault Ste. Marie, Mich.—Acting Asst. Surg. W. Townsend reports the inspection of 1,348 aliens, of whom 51 were certified, including 14 for trachoma.

Savannah, Ga.—Surgeon F. W. Mead reports that 168 aliens were examined, of whom 4 were certified. Among these was one for favus.

Seattle, Wash.—Acting Assistant Surgeon Underwood reports 5,871 aliens inspected, of whom 65 were certified for trachoma and 1 for tubercle of the lungs.

Sumas, Wash.—Acting Asst. Surg. E. S. Clark reports that 1,448 aliens were examined, of whom 56 were certified. Among these were 47 for trachoma.

Tacoma, Wash.—Acting Asst. Surg. F. J. Schug reports the inspection of 1,600 aliens, of whom 183 were certified, among whom were 142 for trachoma.

In addition to the ports above mentioned, the medical inspection of arriving aliens was also maintained at Brunswick, Ga.; Fernandina and Tampa, Fla.; Port Arthur and Hidalgo, Tex.; Kyle, S. Dak.; and Newport, Vt.

CANADA—*Halifax, Nova Scotia.*—Acting Asst. Surg. T. W. R. Flynn reports that 730 aliens were inspected and 64 certified, among these being 2 for trachoma and 4 for favus.

St. John, New Brunswick.—Acting Asst. Surg. C. A. Bailey reports the inspection of 14,434 aliens destined for the United States, of whom 325 were certified, among these being 11 for trachoma.

Winnipeg.—Acting Asst. Surg. H. J. Watson reports the examination of 7,376 aliens, of whom 1,671 were certified.

Medical officers were also detailed for the examination of arriving aliens at the following additional Canadian ports, viz, Quebec, Victoria, Vancouver, and Lethbridge.

CHINA—*Hongkong.*—Acting Asst. Surg. J. Spencer Hough reports that during the fiscal year 6,593 aliens destined for the Pacific coast of the United States, and Honolulu, were inspected, of whom 2,458 were rejected for trachoma, and 2 for scabies. For the Philippines, 961 were inspected, of whom 494 were rejected for physical causes.

ITALY—*Naples.*—Asst. Surg. R. A. C. Wollenberg reports that 121,897 aliens departing on 267 ships have been inspected, and the rejection of 7,224 recommended. Among the causes for rejection were 3,815 for trachoma, 210 for favus, and 699 for other causes.

JAPAN—*Kobe.*—Acting Asst. Surg. Harold Slade reports the inspection of 11,338 departing aliens, of whom 5,196 were rejected for physical causes.

Nagasaki.—Sanitary Inspector Robert Bowie reports the inspection of 1,707 departing aliens, of whom 474 were rejected for physical causes.

Yokohama.—Passed Asst. Surg. Hugh S. Cumming reports the examination of 6,689 departing aliens, of whom 420 were rejected for various physical causes, among these being 415 for trachoma, 1 for favus, and 1 for leprosy.

SANITARY REPORTS AND STATISTICS.

PUBLIC HEALTH REPORTS.

Information relating to health conditions and sanitary measures for the prevention of disease, and against its spread both in the United States and in foreign countries, has formed, as in past years, the leading feature of the Public Health Reports. The collection of morbidity and mortality statistics of States and cities of the United States has been continued. For this purpose blanks have been sent to all cities of the United States of over 10,000 population, and the resulting information, constantly growing in extent, has been published weekly. Statistical reports and mortality tables of foreign countries and cities, prepared from reports received from consuls and from foreign health officers, have also been presented.

The prevalence of cholera, yellow fever, plague, and smallpox throughout the world, as drawn from the tables of these diseases appearing weekly in the Public Health Reports, is shown in the following synopsis, covering the fiscal year ending June 30, 1908.

CHOLERA.

There was 1 fatal case reported from Honolulu, Hawaii, in December, 1907. In the Philippine Islands, at Manila, from July to March there were 421 cases and 355 deaths, and in January 4 cases and 1 death from the steamship *Romulus*, at the Cebu quarantine station. In the Philippine provinces from July to February there were 360 cases and 283 deaths. The greatest prevalence was in Zambales Province, 158 cases and 108 deaths in January and February, 1908.

In Russia, from July 16, 1907, to January 7, 1908, there were reported 12,204 cases of cholera with 5,909 deaths. The principal cities affected were Astrakhan, Kief, Baku, St. Petersburg, Moscow, Samara, Nizhni-Novgorod, Rostov, and Zarazyn. In Astrakhan there were 1,583 cases and 873 deaths; in Kief, 1,390 cases and 363 deaths; in Baku, 165 cases and 89 deaths, and in Moscow, from August to November, 9 fatal cases in the industrial district. At St. Petersburg, from August to September, 28 cases and 18 deaths occurred; at Samara, 383 cases and 204 deaths; at Nizhni-Novgorod, 245 cases and 197 deaths; at Zarazyn, 255 cases and 120 deaths. The chief prevalence in the government districts was in the Astrakhan district, with 2,262 cases and 1,114 deaths; and in Samara, Saratov, Tzaritzin, Tomsk, and in the Amolinsk and Archiereiski-Passelok territories. The last case in Russia during the fiscal year 1908 was reported January 14, 1908, at Tomsk. Cholera was present also in the Ekaterinislav government district, including Ekaterinislav and Rostov; the Kastroma, including Kastroma; the Pensa, including Pensa, and in the Volga middle district and the Siberia government district.

In Turkey in Europe, at Constantinople, there were 13 cholera deaths from November to January.

In Asiatic Russia there were 3 fatal cases at Astara and 1 at Tiflis in November. In the Hedjaz, Arabia, there was an epidemic, mainly among pilgrims. From December to March 6,378 cases and 5,695 deaths occurred. At Mekka there were 5,086 cases and 4,706 deaths; at Medina, 330 cases and 220 deaths; at Jiddah, 410 cases and 369 deaths; and at Yembo, 310 cases and 213 deaths. A few cases were reported at Kamaran in November and December. On the Hedjaz Railroad there were, from January to March, 169 cases and 89 deaths. Many cases occurred on pilgrim vessels. In Asiatic Turkey, in November and December, fatal cases were reported from Hassan Kala, in the Erzroom district, and from Khorassan and Sinope.

In China, from September to April, there were 84 cases and 36 deaths. Shanghai, Tientsin, and Amoy among other localities suffered from visitations of the disease. At Saigon, Indo-China, cholera was present in February, and during March and April there were 77 cases and 56 deaths. In India, the epidemic at Kashmir, which began in November, 1907, extended into the year 1908. There were 10,555 cases and 6,563 deaths from May to July. The greatest prevalence during the fiscal year in the cities was at Calcutta, which reported 4,517 deaths; Madras, 723 deaths; Bombay, 425; Tuticorin, 408; Cochin, 221, and Rangoon, 186 deaths. At Moulmine, from May to July, 1907, there were 42 cases and 1 death. In Bengal, in the month of April, 1908, an average of 30 deaths was recorded daily in the coal fields. At Point de Galle and Colombo, Ceylon, cholera was present. At Bangkok, Siam, in August, 1907, there were 17 cases and 12 deaths. In the Straits Settlements, at Penang, in September and October, 2 cases and 1 death, and from June to October, 168 deaths. In January, 1908, there was a single death. Cholera was present at Perlis in October. In Manchuria, in September and October, the disease was present at Antung. At Dalny there were 23 cases and 18 deaths, and at Port Arthur 4 fatal cases.

In the Empire of Japan from September to November, inclusive, 3,049 cases and 1,873 deaths were reported. The principal places visited were Kobe, with 486 cases and 337 deaths; Moji, with 514 cases and 400 deaths; Nagasaki ken, including Nagasaki, 407 cases and 244 deaths; Osaka, 324 cases and 226 deaths; Shimonoseki, 85 cases and 56 deaths; Tokyo, 294 cases and 125 deaths; and Yokohama, 77 cases and 51 deaths. The island of Formosa had 2 cases and 1 death; de Vries, Oshima Island, 5 cases. Cholera was reported on vessels at Moji, Shimonoseki, Shinagawa, and Yokohama. In Korea cholera was present at Seoul, mainly in September and October. On Nankanoshima Island, in September, there was a small epidemic.

In Africa, during August, 1907, there were two deaths at Algiers, and in Egypt, during May, the disease was present among pilgrims at the Suakim quarantine station.

YELLOW FEVER.

The only cases of yellow fever in the United States during the fiscal year were 3 fatal cases imported by vessels and confined to quarantine; 1 case at the Baltimore quarantine from Daiquiri, and 2 cases at the Galveston quarantine from Brazilian ports.

In Cuba 182 cases and 63 deaths were reported during the fiscal year. In Habana Province 40 cases and 16 deaths occurred, and in

the city of Habana 15 cases and 3 deaths, mainly imported from other places in the province. The greatest prevalence was in Santa Clara Province, where there were 111 cases and 33 deaths. Cienfuegos was the principal seat of the disease. From August to January there were 91 cases and 27 deaths, 10 cases being among troops. In Camaguey Province there were 4 cases and 2 deaths; in Matanzas Province, 19 cases and 10 deaths; and in Santiago Province, at Gibara, 1 case in September, from a steamship, and at Santiago, 7 cases and 2 deaths, 1 being a case from a steamship.

In Mexico, in August, there was 1 case at Manzanillo from a steamship; in September, 1 case at Veracruz; and in May and June, 5 cases and 3 deaths at Laguna de Terminos, 3 cases being from a vessel.

In Central America the disease was present in Costa Rica, where there were a few cases at San Jose, San Mateo, and Punta Arenas. In Guatemala there was a case at Puerto Barrios in June, 1907. The disease was also present on the railroad from Puerto Barrios to Guatemala City, at Chiquimula, and Zacapa. In Nicaragua it was present at Managua in November. In Panama, in July, there was 1 case on a steamship at Ancon. In the West Indies 19 cases with 12 deaths occurred in the Barbados, at Bridgetown and in the vicinity. Six cases were from a British cruiser. At Trinidad, from June to November, there were 18 cases and 7 deaths at Port of Spain, and from January to May, 1908, 8 fatal cases in the vicinity.

In South America the disease occurred in Brazil, Colombia, Ecuador, and Venezuela. In Brazil there were 100 deaths at Manaos; at Para, 386 cases with 263 deaths; at Pernambuco, 3 fatal cases; and at Rio de Janeiro, 25 cases and 15 deaths. In Colombia, at Barranquilla, in May, 1907, there was 1 death. In Ecuador, at Guayaquil, 98 deaths, and at Huigra, 4 deaths. In Venezuela the disease was present at La Guaira from November to February, and at Ciudad Bolivar in January and February, 1908.

PLAGUE—FOREIGN AND INSULAR.

In Hawaii 3 fatal cases were reported at Hilo. At Honolulu there were 4 cases with 2 deaths from July to September, 1 case being from a steamship.

In the Philippine Islands there was 1 fatal case in quarantine at Manila in July.

In the West Indies 3 deaths from plague were reported from Trinidad in June, 1908.

In South America there were outbreaks of the disease in Venezuela, at Caracas, in May and June, 1908, with 8 cases and 4 deaths; and at La Guaira, from March to June, with 89 deaths. In Ecuador, from February to May, 1908, 318 deaths from plague occurred. It was present along the Guayaquil and Quito Railroad and at Huigra. In Peru there were 1,184 cases with 623 deaths. The principal cities reporting were Trujillo, 441 cases with 229 deaths; Lima, 159 cases with 85 deaths; Callao, 57 cases with 22 deaths; and Paita, 116 cases and 86 deaths. It was also present at Chiclayo, San Pedro, and many other cities along the coast. In Chili there were at Antofagasta 204 cases with 49 deaths; and at Valparaiso, from December to April, 35 cases with 16 deaths, one case being from the steamship *Californica*. The disease was also present at Arica and Iquique throughout the fiscal year. In Argentina it was present in June

at Cordova. In Brazil, at Bahia, there were 101 cases with 82 deaths; at Rio de Janeiro, 153 cases with 38 deaths; and at Pernambuco, 16 deaths. The disease was present at Santos in December, at Corumbo in January, at Para in February and March, 1908, and at São Paulo in August and May. There were 5 cases at Montevideo, Uruguay.

In Europe, in June, 1907, 3 cases occurred in the vicinity of Astrakhan, and a fatal case was reported in July at Odessa in the shipping. Two cases were treated at the Frioul quarantine station, Marseille, in September. At Glasgow there was a case in August and one in October.

In India, the chief center of plague, there was a total of 730,729 cases and 615,037 deaths. The greatest prevalence was in the Punjab, 372,820 cases and 334,425 deaths; in Bombay, 158,499 cases and 114,502 deaths; and in the United Provinces, 93,943 cases and 83,814 deaths. In April and July, 1907, there was an outbreak of plague in the Bahrein Islands with 1,712 cases and 1,709 deaths.

In the Hedjaz, Arabia, in 1908, there were 71 cases, with 68 deaths. At Yembo there were 137 cases and 126 deaths.

At Hongkong, China, during the fiscal year there were 463 cases and 368 deaths. At Amoy, in Kulangsu, plague was present from July to November and epidemic in April, 1908. In the first half of the fiscal year it was present also at Gei Hai, Macao, Swatow, and Tengchow. The disease was also present in Foochow and Tengchow. At Kaiping, Manchuria, from August to October there were 212 deaths. In Indo-China the disease was present at Cholen, Saigon, and Pnompenah.

At Bagdad, Turkey in Asia, there was a small epidemic; and the disease was present at Smyrna, Bassorah, Beirut, Dikeli, Mytelene, Adalia, and Kerbela. In Persia, in 1907, plague was present at Bushire in June and at Mohammerah in August. The disease was present in Siam. Singapore, in the Straits Settlements, suffered a small epidemic.

The greatest prevalence in Japan was in the island of Formosa, where 1,732 cases and 1,494 deaths occurred. At Osaka during the fiscal year 519 cases and 469 deaths were reported, and at Yokohama 14 fatal cases. The disease was present at Kobe, Tokyo, Sasebo, Yokosuka, Goto Island, and Nushima Island. There was a single death in Korea at Nakanoshima.

In Africa plague was present in Tunis and Algeria. In Algeria there were cases at Bône, Oran, and Philippeville; in Tunis, at the city of Tunis, at Bizerta, and Kairwan. In Egypt there were, at Alexandria, 156 cases, with 91 deaths; at Port Said 6 cases, with 12 deaths, and at Damietta 1 case. In the provinces there were 1,048 cases and 582 deaths. In the British Gold Coast there was an outbreak from January to April, 1908, principally at Akkra, where there were 128 deaths. The disease broke out at Brewa, Adjumatlo, Tema, Nianyan, and Cape Castle. British South Africa was infected by the disease, which was present at King Williams Town, Izeli Location, Wartburg, Izinyoka, and Thomas River. At Lourenço Marquez, Portuguese East Africa, and Majunga, Madagascar, plague was reported. On the island of Mauritius there were 142 cases, with 111 deaths. Zanzibar reported a number of fatal cases from June to October, 1907.

In Australia, at Brisbane, there were 18 cases and 12 deaths; at Sydney 6 cases and 2 deaths; at Cairns 12 cases, with 7 deaths, and at

Melbourne, in May, there was a fatal case in the shipping. The disease was present at Kempsey and Mackay. At Auckland, New Zealand, in May and June, 1907, there were 3 fatal cases.

SMALLPOX IN THE UNITED STATES.

Forty-two States, two Territories, and the District of Columbia reported 31,190 cases of smallpox and 81 deaths. The States reporting the greatest number of cases were, in the order mentioned, Minnesota, Texas, Kansas, Illinois, Indiana, Wisconsin, and Michigan. In Minnesota the disease was distributed quite evenly throughout the State. The cities reporting the greatest number of cases were Duluth, Minneapolis, St. Paul, Winona; and the counties, Blue Earth, Dakota, Martin, Stearns, and Wright. In Texas also smallpox was diffused throughout the State. The cities having the greatest number of cases were Forth Worth, San Antonio, and Houston; the counties, Titus, Harrison, Fisher, Lamar, and Bell. In Kansas the prevalence of the disease was most marked in Atchison, Topeka, Kansas City, and Wichita; and in Atchison, Republic, and Cherokee counties. In Illinois, Springfield and Chicago were the chief seats of the disease; in Indiana, the city of Indianapolis and the counties of Lagrange and Madison; in Wisconsin, La Crosse and Milwaukee; in Michigan, Saginaw and Manistee; in California, San Francisco and Los Angeles; in Louisiana, New Orleans; in Montana, Missoula; in New York, Kingston; in Ohio, Cincinnati; in Oregon, Portland; in Tennessee, Nashville and Memphis; and in Washington, Seattle, Spokane, and Tacoma. During the fiscal year the District of Columbia reported 175 cases.

In accordance with custom notices of outbreaks of smallpox received through press clippings were used as guides in mailing smallpox literature to local health officers. Literature of this character was sent to 64 health officers in 25 different States.

SMALLPOX—FOREIGN AND INSULAR.

In Hawaii there were 11 cases and 2 deaths, all from vessels; in Panama, at Colon, 6 cases, 3 of them from the shipping; in Porto Rico, in April and June, 2 cases were reported at Mayaguez. In the Philippine Islands, 152 cases with 32 deaths were recorded from Manila, and 102 cases in the provinces. The greatest prevalence in Mexico was at Aguas Calientes and Mexico City; in Brazil, at Bahia, Rio de Janeiro, and Pernambuco; in Ecuador, at Guayaquil. In Venezuela, in December, there was a large epidemic in the vicinity of Caracas. In Europe smallpox was reported to the usual extent in the large cities. The disease was reported from Italy in general, and especially at Genoa and Naples. In China the greatest prevalence was at Hongkong and Shanghai. The greatest epidemic was in Japan, from January to March, where over 14,000 cases occurred, mainly at Kobe and Osaka. Smallpox was reported from Seoul, in Korea; Cholen and Saigon, in Indo-China; Batavia, in Java; Bagdad, in Turkey; and Teheran and Kermanshah, in Persia. In Africa the disease was present in Algiers, Cairo, and throughout Egypt, and a few cases were reported at Cape Town, East London, Pretoria, Kimberly, and Lourenço Marquez.

SERVICE PUBLICATIONS.

During the year there have been distributed to state and local health officers, sanitarians, and practicing physicians 222,456 copies of the various service publications, including the annual reports of the work of the service by the Surgeon-General; transactions of the conferences of the state and territorial health officers with the Public Health and Marine-Hospital Service, giving in detail the interesting discussions engaged in at these meetings; the Public Health Reports, published weekly, giving a summary of the sanitary condition of the ports of the world and of the existence and prevalence of epidemics in the United States and abroad; bulletins of the Hygienic Laboratory, giving the results of investigations of infectious and contagious diseases and matters pertaining to the public health; bulletins on the prevention of yellow fever, distributed especially throughout the States liable to epidemics of this disease; pamphlets describing the nature and prevention of plague, distributed largely in States afflicted with this disease or in danger of infection.

Special bulletins on the subject of "Trachoma, Its Character and Effects," have been distributed to ships' surgeons and others coming in contact with or otherwise interested in this dangerous contagious disease, so common among immigrants.

Pamphlets describing pellagra and giving a brief review of our present knowledge of the subject were sent to health officers and practicing physicians throughout the Southern States, where it has been discovered during the last year or two that this highly fatal disease prevails to an unexpected extent.

Many copies of the "Handbook for the Ship's Medicine Chest" were supplied to vessels of the merchant marine. This book, as its title implies, gives information as to the treatment of minor ailments and emergencies and is used in connection with the medicine chest carried by vessels.

The publication for which there has been the greatest and most constant demand is the bulletin entitled "Milk and Its Relation to the Public Health." This volume seems to have met a need keenly appreciated by health officers and to have supplied timely information not otherwise obtainable. The demand was so great that both the edition available for distribution from the bureau and that for sale by the superintendent of documents were rapidly exhausted.

There has also been a constant demand for the reports of the board of officers making investigations into the origin and causes of the prevalence of typhoid fever in the District of Columbia. Requests come largely from local health officers who have typhoid problems of their own, and sanitary engineers and sanitarians in general, who have been impressed with the importance of the work being done and its value as an aid in the solution of similar problems elsewhere.

A catalogue has been published giving a list of the titles of the service publications, with full information as to their nature, and where and how the various bulletins and reports can be obtained.

MARINE HOSPITALS AND RELIEF.

RELIEF OF SEAMEN.

During the year 54,301 seamen were treated at the various stations of the service. Of these, 14,778 were treated in hospital and 39,523 were treated as out-patients. The number of days hospital relief furnished seamen was 426,957, an excess of 18,946 over the preceding year.

Nine hundred and fifty-six seamen from foreign vessels were treated. The number of days hospital relief furnished these seamen was 10,120.

RELIEF STATIONS.

The service operated 21 hospitals, all of which are owned by the Government, and maintained 126 other stations where hospital and dispensary relief were furnished.

During the year new stations of the third class in charge of acting assistant surgeons were established at Bellingham, Wash., Kansas City, Mo., and Port Arthur, Tex.

A marine hospital, as provided by act of Congress of March 24, 1902, is under process of construction at Buffalo, N. Y.

Building plans for a marine hospital at Pittsburg, Pa., have been completed at the office of the Supervising Architect, Treasury Department.

Congress at its last session appropriated \$100,000 for rebuilding the marine hospital at New York, with authorization to incur an additional expenditure of \$150,000.

AID TO OTHER BRANCHES OF THE GOVERNMENT.

Revenue-Cutter Service.—One thousand six hundred and forty-five men were physically examined, of whom 273 were rejected.

Special assistance to this service in the nature of duty on special boards, on United States revenue-cutters, etc., is mentioned under other heads.

Steamboat-Inspection Service.—One thousand and thirty-six pilots were examined as to visual capacity, of whom 33 were rejected.

Life-Saving Service.—One thousand six hundred and eighty-six keepers and surfmen were physically examined, and 60 rejected; 420 papers, consisting of reports of physical examinations and disability claims of keepers and surfmen of the Life-Saving Service, were referred to this bureau by the general superintendent, and acted upon. These papers called for expression of opinion upon the medical evidence of disability submitted in claims for benefits under the act of May 4, 1882, and of the physical fitness of candidates for enlistment or reenlistment. The new blank form of application for and

report of medical inspection of keepers and surfmen, which was prepared last year, with the cooperation of the general superintendent of the Life-Saving Service, has proved of great value in arriving at a conclusion as to whether the applicants were physically fit.

In addition to the work done by the special officers and by regular officers at their stations, 4 commissioned officers were this year detailed to points along the Atlantic coast between July 21 and August 1 to examine keepers and surfmen for reenlistment.

Coast and Geodetic Survey.—Ninety-seven employees and applicants for appointment were examined and 11 were rejected.

Light-House Service.—Thirty-six applicants for enlistment were examined and 4 rejected.

Immigration Service.—Twenty-one persons connected with the above service were physically examined and 3 were rejected.

Civil Service Commission.—One hundred and forty-six applicants for appointment were physically examined and 12 rejected.

Isthmian Canal Commission.—Nineteen employees and applicants for appointment were physically examined and none rejected.

Physical examination of merchant seamen.—Physical examinations were made of 274 American merchant seamen, of whom 27 were rejected. Ten foreign seamen were also examined, of whom 4 were rejected.

Physical examinations, Philippine Islands.—In the Philippines 240 examinations were made of seamen, engineers, and pilots, of whom 34 were rejected.

RELIEF TO SUFFERERS FROM THE GREAT FIRE IN CHELSEA, MASS.

During April of this year a great fire occurred in Chelsea, Mass., depriving thousands of people of their homes and destroying several of the principal hospitals of the city.

Upon request of the Chelsea city officials, a lying-in ward was opened at the Marine Hospital, and all suitable cases, upon application, were admitted for treatment. Other cases of sickness and injury were admitted for treatment upon application. In all, 70 cases were furnished treatment during April, May, and June. The prompt action by the officer in command of the Marine Hospital in extending relief, and its approval by the department, were highly appreciated by the community.

The following statement shows in detail the number of cases treated on account of this emergency: Exhaustion, 7; rheumatism, 3; bronchitis, acute, 1; enteric fever, 5; measles, 2; debility, 7; paralysis, 2; pneumonia, 1; pleurisy, acute, 1; osteo-myelitis, 1; pregnancy, 9; childbirth, 4; diphtheria, 1; scarlet fever, 1; erysipelas, 1; hemorrhage, lungs, 1; wound of scalp, 1; morphine poisoning, 1; fracture of spinal column, with multiple injuries, 1; contusions, 8; burns, 2; abscess of axilla, 1; fracture of thigh, compound, 1; concussion of brain, with fracture of arm, 1; fracture of skull, 2; convalescent from surgical operation, 2; fracture of leg, both bones, 1; amputation of arm, 1; fracture of leg, compound, 1.

By act of Congress, approved May 23, 1908, the sum of \$150 was directed to be allowed by the accounting officers of the Treasury for expenses to this time incurred in the care of the patients above re-

ferred to and authorization was given for further expenditure of \$3,600 for continued care for a period extending not longer than to the close of the fiscal year 1909.

PURVEYING DEPOT.

The following statistics show the transactions of the purveying depot during the fiscal year:

SUPPLIES PURCHASED.	
Medical supplies-----	\$14,116.14
Dry goods-----	9,997.71
Pharmaceutical appliances, etc-----	5,748.91
Beds and bedding-----	5,071.50
Surgical appliances, instruments, etc-----	5,413.91
Alcohol, wines, etc-----	1,423.28
Books and journals-----	1,254.88
Rubber goods-----	1,162.57
Flags-----	751.36
Packing boxes and sawdust-----	376.50
Bacteriological supplies-----	17.25
Total-----	45,334.01

Cr.

By bills paid direct from funds:

Quarantine service-----	\$2,847.20
National quarantine and sanitation-----	936.33
Leprosy Investigation Station-----	826.33
Bureau (books and journals)-----	393.66
Maintenance (journals)-----	389.70
Care of seamen, etc. (journals)-----	233.62
Epidemic fund-----	86.87
	5,713.71
	39,620.30

By amounts reimbursed from other appropriations for supplies issued from stock:

Quarantine service-----	\$3,501.98
National quarantine and sanitation-----	1,090.36
Treasury Department-----	158.61
Epidemic fund-----	60.13
Leprosy-investigation station-----	36.63
	4,847.71

Net expenditures chargeable to appropriation for purveying depot (in amount, \$35,000)-----	34,772.59
Salaries-----	\$6,005.00
Rent-----	3,250.00
Operating expenses-----	376.74
	9,631.74

Total net expenditures-----44,404.33

Number of requisitions filled-----	308
Number of packages shipped-----	3,464
Total weight of supplies shipped-----pounds--	464,990

SANATORIUM FOR CONSUMPTIVE SEAMEN AT FORT STANTON, N. MEX.

Surg. P. M. Carrington, in charge, states that the work of the sanatorium during the fiscal year covered by this report has been very satisfactory both in regard to the number of patients treated and the results obtained.

The greatest number of patients under treatment at any one time during the year was 208.

The treatment relied upon continues to be climatic, hygienic, and dietetic, and the officer in charge of the ambulant sick call continues to exercise a close supervision over all the patients under his care, and these comprise a considerable majority of the patients under treatment. The breathing exercises are used, but constant care and supervision exercised, excluding all concerning whom there is a doubt as to the advisability of permitting this exercise. He carefully goes through the entire number once a week, paying particular attention to the pulse rate and excluding from the exercise all those whose pulse runs 90 to 100. He follows up his morning sick call by frequent visits throughout the tent village, where most of his patients are quartered, attempting particularly to keep within proper limits the amount of exercise permitted to each patient.

Following the reports of Surgeon Wright, of the navy, on the administration of mercury in tuberculosis at the naval sanatorium at Fort Lyons, Colo., about thirty cases were selected and succinimide of mercury administered by deep muscular injection for a period covering about three months. No results warranting its further use were obtained.

The administration of tuberculin by the mouth, as used by Dr. Arthur Latham, of London, has recently been begun. While too early to speak with any degree of positiveness, the results thus far have encouraged the continuance of this treatment in carefully selected cases.

Acting Assistant Surgeon Keiller, in charge of the surgical work of the station, by removing decayed teeth and teeth which had become very loose by reason of pyorrhea alveolaris, has succeeded in improving the appetite and stomach digestion of a great many patients. He has also operated successfully on a considerable number of cases of piles and fistula in ano.

It is considered advisable to remodel all tents in accordance with the latest plan at the earliest practicable date, and here it may be well worth mentioning that there is not a patient in the sanatorium who does not prefer a tent or tent house as a residence to the large dormitories, and the objection which has been made by some that tents and tent houses would prove uncomfortably cold in winter has proven to be without foundation, even when the temperature has been 15° below zero. A large number of inquiries have been received concerning the tent and tent house used at the sanatorium, and a model of the latter has been furnished the state health officer of Rhode Island and another is being prepared for the Pennsylvania board of health.

The large death rate during the fiscal year ended June 30, 1908, is readily accounted for by the very large preponderance of far-advanced cases as well as of serious complications, and it is a matter of not uncommon occurrence to find upon post-mortem examination that the lung showed entire healing and that the cause of death was some other chronic disease, like cirrhosis of liver. The percentage of patients who suffer from pyorrhea alveolaris and dental caries is found to be from 65 to 75 per cent. These conditions affect appetite and stomach digestion of those so afflicted, and a considerable percentage have also, prior to coming to the sanatorium, been addicted to the

excessive use of alcoholic beverages, resulting in derangements of the stomach, which are very difficult to contend with.

The following statistics show the transactions at Fort Stanton for the fiscal year:

Patients under treatment July 1, 1907	186
Patients admitted during the year	183

369

Patients under treatment July 1, 1908	194
Patients discharged during the year	175

369

Ages of patients treated during the year:

Under 25 years	68
Between 25 and 34 years	117
Between 35 and 44 years	97
Between 45 and 54 years	66
Over 54 years	14
Nontubercular (lungs)	7

369

Heredity in patients treated during the year:

History of tuberculosis in parents	53
No history of tuberculosis in parents	286
History of tuberculosis in parents, doubtful	25
Nontubercular (lungs)	5

369

Stage of disease of patients admitted:

Incipient	11
Moderately advanced	52
Far advanced	115
Nontubercular (lungs)	5

183

General condition on arrival:

Good	13
Fair	94
Poor	61
Grave	10
Nontubercular (lungs)	5

183

Tubercle bacilli in sputum:

Were found in	165
Were not found in	13
Nontubercular (lungs)	5

183

Record of pulmonary hemorrhages of patients admitted:

Before arrival only	43
After arrival only	9
Both before and after arrival	25
Neither before nor after arrival	77
Streaked sputum	24
Nontubercular (lungs)	5

183

Condition of patients at time of discharge:

Cured.....	1
Apparently cured.....	13
Arrested.....	39
Improved.....	23
Unimproved.....	13
Died.....	84
Nontubercular (lungs).....	2

175

DURATION OF STAY AND CHARACTER OF CASES.

Character of case.	Longest stay.			Shortest stay.			Average stay.		
	Yrs.	mos.	dys.	Yrs.	mos.	dys.	Yrs.	mos.	dys.
Cured.....	3	1	4	3	1	4	3	1	4
Apparently cured.....	5	1	21	0	6	17	1	9	12
Arrested.....	6	7	12	0	2	4	1	2	17
Improved.....	2	10	19	0	0	29	0	7	12
Unimproved.....	1	4	25	0	0	5	0	6	9
Death.....	6	5	11	0	0	3	0	11	4

Condition of patients who remained under treatment at the close of the year.

Cured.....	0
Apparently cured.....	0
Arrested.....	69
Improved.....	76
Unimproved.....	24
Nontubercular (lungs).....	5
Under treatment less than thirty days.....	20

194

During the year there were under treatment, in addition to the above, tuberculous officers and employees, as follows:

Under treatment July 1, 1907.....	13
Admitted during the year.....	11
	24
Remaining under treatment June 30, 1908.....	14
Discharged during the year.....	10
	24

Condition of tuberculous employees at time of discharge:

Cured.....	0
Apparently cured.....	5
Arrested.....	1
Improved.....	0
Unimproved.....	2
Died.....	2

10

Number of physical examinations made during the year, 1,232.

LABORATORY.

The routine work of the laboratory during the fiscal year comprises the following:

Examinations of sputum.....	1,295
Examinations of urine.....	1,148
Examinations of blood.....	15
Guinea pigs injected with sputum.....	12
Necropsies, including microscopical examinations of organs.....	69

The quantity of milk furnished during the year was 38,569 gallons.

At the beginning of the fiscal year the beef herd numbered 1,292. During the year it has increased to 1,517. This is considered a very favorable increase, and with the increase of the pasturage by 3,000 acres, which was completed during the year, gives a herd sufficient to supply the needs of the station and very nearly the maximum number of cattle which can be supported upon the range.

During the fiscal year 70 beeves were slaughtered, which produced 33,379 pounds of beef, averaging better meat than that which the station had been able to purchase by contract.

The herd of horses upon which the station depends for use on the farm and garden with the cattle and for communication with the nearest railroad point, has increased during the fiscal year from 53 to 60.

The total yield of alfalfa saved for the season of 1907 was 215 tons.

The station continues to depend upon the garden for a sufficient quantity of fresh vegetables to give a variety during the summer months to the customary diet. Owing to the distance from good markets this feature appeals strongly to the majority of the patients.

PERSONNEL.

COMMISSIONED AND OTHER OFFICERS.

The commissioned medical officers at the beginning of the fiscal year, July 1, 1907, numbered 125, as follows: The Surgeon-General, 5 assistant surgeon-generals, 28 surgeons, 57 passed assistant surgeons, and 34 assistant surgeons.

Fourteen commissioned medical officers are assigned to exclusive immigration duty for the physical and mental examination of aliens, their services being supplemented by employment of acting assistant surgeons.

Five commissioned medical officers are detailed to the quarantine service of the Philippine Islands.

Seven commissioned medical officers are detailed for service upon vessels of the Revenue-Cutter Service.

Seventeen commissioned medical officers are detailed at the several quarantine stations in the continental United States, in Porto Rico, and the Hawaiian Islands.

Three passed assistant surgeons and two assistant surgeons are assigned to duty in foreign countries to prevent the introduction into the United States of epidemic disease.

Three passed assistant surgeons were promoted to the grade of surgeon.

Eight assistant surgeons were promoted to the grade of passed assistant surgeon, and 9 assistant surgeons were commissioned during the year; 1 surgeon died; 1 passed assistant surgeon and 4 assistant surgeons resigned; 1 surgeon and 1 passed assistant surgeon continued on waiting orders for physical disability. The number remaining in the service June 30, 1908, were the Surgeon-General, 5 assistant surgeon-generals, 29 surgeons, 62 passed assistant surgeons, and 31 assistant surgeons; total, 128.

Sanitary inspectors.—Three sanitary inspectors served during the entire year.

Acting assistant surgeons.—At the beginning of the fiscal year there were 255 acting assistant surgeons on duty; 193 were appointed, 2 died, 165 were separated from the service by limitation of appointments, resignations, and removals, leaving on duty at the close of the fiscal year 281 such officers.

Medical inspectors.—Two female inspectors served during the entire year for the inspection of women passengers—one at Honolulu, Hawaii, and one at San Francisco quarantine station.

Internes.—At the beginning of the fiscal year there were 8 internes on duty at the various marine-hospital stations, 13 were appointed, and 9 separated from the service by reason of resignation, leaving 12 on duty at the close of the fiscal year.

Pharmacists.—At the beginning of the fiscal year there were on duty 47 pharmacists, divided as follows: Pharmacists of the first class, 16; second class, 22; third class, 9. Two pharmacists, second

class, and 1 of the third class resigned; 2 appointments as pharmacist of the third class were revoked; 2 of the third class were promoted to the second class, and 8 appointments were made to the position of pharmacist of the third class, which, together with promotions to fill vacancies caused by death, resignations, and removals, as above, leaves 48 pharmacists on duty at the close of the fiscal year, as follows: Pharmacists of the first class, 16; second class, 20; third class, 12.

Pilots and marine engineers.--At the beginning of the fiscal year there were on duty 12 pilots and 21 marine engineers; 2 pilots resigned and 4 were appointed; 8 marine engineers were separated from the service and 9 were appointed. The number on duty at the close of the fiscal year is as follows: Pilots, 14; marine engineers, 22.

HOSPITAL AND QUARANTINE ATTENDANTS.

At the beginning of the fiscal year 744 attendants were employed at the various marine hospitals, quarantine stations, and on epidemic duty, not including 74 such employees on duty in the Philippine Islands, and at the close of the fiscal year there were 1,151 so employed, as follows:

Branch of service in which employed.	In service July 1, 1907.	Appointed during year.	Separated from service.	In service June 30, 1908.
Marine-Hospital Service.....	428	1,122	1,109	441
Quarantine (including Porto Rico and Hawaii).....	283	365	350	298
Epidemic.....	33	1,085	673	412
Total.....	744	2,572	2,132	1,151
Philippine Islands.....	74	20	20	74

RECAPITULATION.

Commissioned medical officers.....	128
Chiefs of divisions, Hygienic Laboratory.....	3
Sanitary inspectors.....	3
Acting assistant surgeons.....	281
Medical inspectors.....	2
Internes.....	12
Pharmacists.....	48
Pilots.....	14
Marine engineers.....	22
Attendants.....	1,225
Total.....	1,738

BOARDS CONVENED.

Sixty-nine boards were convened at different times and at various stations throughout the United States for the physical examination of officers of the Revenue-Cutter Service and applicants for entrance therein. Three boards were convened for the examinations of assistant surgeons to determine their fitness for promotion to the grade of passed assistant surgeon. One was convened to examine an officer of the service to determine whether his physical condition was such as to entitle him to be placed on "waiting orders;" nine for the physical examination of detained aliens; two for the examination of phar-

macists to determine their fitness for promotion to a higher grade; one for examination of applicants for entrance as assistant surgeons. Six officers were assigned to duty on Revenue-Cutter Service retiring boards; two were convened to make physical examination of employees of the Life-Saving Service; one was convened to revise and prepare book of instructions regarding medical inspection of immigrants; one was convened to recommend site for quarantine station at Galveston, Tex.

OFFICERS DETAILED TO REPRESENT THE SERVICE AT MEETINGS OF
MEDICAL AND PUBLIC HEALTH ASSOCIATIONS.

Asst. Surg. Gen. J. W. Kerr: Conference of the national legislative council and committee on medical legislation of the American Public Health Association, at Chicago, Ill., December 10 to 13, 1907; National Association for the Prevention of Tuberculosis, at Chicago, Ill., June 4 to 6, 1908; National Association of the Milk Commission, at Chicago, Ill., June 1, 1908.

Surg. J. H. White: Section pathology and bacteriology of the American Medical Association, at Chicago, Ill., June 2 to 6, 1908.

Surg. L. L. Williams: Sixteenth annual meeting of Association of Military Surgeons, at Norfolk, Va., October 15 to 18, 1907.

Surg. C. P. Wertenbaker: Sixteenth annual meeting of Association of Military Surgeons, at Norfolk, Va., October 15 to 18, 1907.

Surg. G. B. Young: Third annual convention of the American Society of Inspectors of Plumbing and Sanitary Engineers, at Chicago, Ill., February 10 to 12, 1908; fourth annual conference of the Council on Medical Education, of the American Medical Association, at Chicago, Ill., April 13, 1908; meeting of the Lake Michigan Water Commission, at Grand Rapids, Mich., May 27, 1908; American Medical Association, at Chicago, Ill., June 2 to 6, 1908.

Surg. M. J. Rosenau: Meeting of American Association of Pathologists and Bacteriologists, at Ann Arbor, Mich., April 17 to 18, 1908.

Passed Asst. Surg. R. Blue: Meeting of state health officers of California, at Riverside, Cal., December 3, 1907; state health officers of California, at Coronado, Cal., April 20, 1908; State Medical Society, Coronado, Cal., April 21, 1908; meeting of city board of health, San Diego, Cal., April 21, 1908.

Passed Asst. Surg. R. H. von Ezdorf: Third International Sanitary Convention, at City of Mexico, December 2 to 7, 1907.

Passed Asst. Surg. J. F. Anderson: Thirty-fifth annual meeting of Public Health Association, at Atlantic City, N. J., September 30 to October 4, 1907.

Passed Asst. Surg. J. W. Schereschewsky: Thirty-fifth annual meeting of Public Health Association, at Atlantic City, N. J., September 30 to October 4, 1907.

Passed Asst. Surg. B. S. Warren: Annual meeting of Oklahoma State Medical Association, at Sulphur, Okla., May 14-16, 1908.

Passed Asst. Surg. W. C. Rucker: State health officers of California, at Coronado, Cal., April 20, 1908; State Medical Society of California, at Coronado, Cal., April 21, 1908; meeting of city board of health, San Diego, Cal., April 21, 1908.

Ch. W. Stiles, Chief Division Zoology, Hygienic Laboratory: Seventh International Zoological Congress: Boston, Mass., August 19-23, 1907; annual meeting of Alabama State Medical Association, Montgomery, Ala., April 21, 1908; North Carolina State Medical Society, at Winston-Salem, N. C., June 17, 1908.

R. Hunt, Chief Division Pharmacology, Hygienic Laboratory: Fifty-fifth annual meeting of the American Pharmaceutical Association, at New York, N. Y., September 2-7, 1907; Council of Pharmacology and Chemistry, at Chicago, Ill., June 2, 1908.

W. R. Brinckerhoff, director Leprosy Investigation Station: Sixth International Dermatological Congress, at New York, N. Y., September 9-14, 1907.

A. Seidell, technical assistant, Hygienic Laboratory: Fifty-fifth annual meeting of the American Pharmaceutical Association, at New York, N. Y., September 2-7, 1907.

A. M. Roehrig, pharmacist: Fifty-fifth annual meeting of the American Pharmaceutical Association, at New York, N. Y., September 2-7, 1907.

J. V. La Grange, pharmacist: Fifty-fifth annual meeting of the American Pharmaceutical Association, at New York, N. Y., September 2-7, 1907.

SPECIAL DETAILS OF OFFICERS.

Three commissioned medical officers continued on detail duty with the Isthmian Canal Commission, serving, respectively, as follows: Surg. H. R. Carter as director of hospitals, Canal Zone; Surg. J. C. Perry as chief quarantine officer and in charge of the quarantine at Panama; and Passed Asst. Surg. Claude C. Pierce as quarantine officer at Colon.

Surg. J. H. White, on the request of the Government of Honduras, was detailed to visit the port of Puerto Cortez and to indicate the measures necessary to place that fruit port in a sanitary condition.

Passed Asst. Surg. L. E. Cofer, in addition to his duties as chief quarantine officer, upon request of the governor of Hawaii and with the approval of the department, served as president of the territorial board of health.

Passed Asst. Surg. Victor G. Heiser, in addition to his duties as chief quarantine officer, was appointed by the Philippine Commission, with the approval of the department, director of health of the Philippine Islands, and Passed Asst. Surg. A. J. McLaughlin was likewise appointed as assistant director of health.

Passed Asst. Surg. B. J. Lloyd, detailed for duty at Guayaquil, Ecuador, under the act of Congress approved February 15, 1893, was on March 21, 1908, appointed by the President of Ecuador director of sanitary work to combat plague in the city of Guayaquil. The request of the President of Ecuador for Doctor Lloyd's services was forwarded by the United States minister and was approved by the State and Treasury Departments.

REVIEW.

A review of the preceding pages suggests further comment upon some matters of unusual importance. Among these is plague, which has assailed our Pacific coast, and although practically eliminated so far as human cases are concerned, remains still a source of anxiety because of the uncertainty that it has been entirely eliminated from among rats, and because it has been found, though in very limited numbers, five in all, among ground squirrels. The destruction of rats, they being the chief carriers of plague, has become a matter of national and international importance. The danger of the spread of plague from the coast to the interior of the United States has been minimized by the very large destruction of rats, as shown in the first portion of this report, and the rapid and great decrease in the percentage of infected rats found among those destroyed. Since rats multiply very rapidly, litters of 10 to 14 being born several times a year, it is very questionable whether by the means at present known the rat population in a great city can be greatly or permanently reduced, but by continued operations the infected ones among them will from time to time be found, so it is reasonable to suppose that in time the plague infection among rats may be eliminated. This shows the necessity of continuing the work of destruction of rats long after the disappearance of plague among human beings and its apparent disappearance among the rats. In view of the continued advance of plague throughout the world and the fact that the rat is the carrying agent, action should be taken everywhere to destroy this animal as a human enemy. This is particularly necessary in seaport cities, but it is likewise true with regard to interior cities. The money value of merchandise and other objects destroyed by rats would alone be sufficient reason for their wholesale destruction. Greater public attention has been called to this matter within the past year or two, and the bureau has in preparation a bulletin giving all necessary information concerning the rat, his habits, diseases to which he is subject, destructive power, and the best methods known for his extermination. While this last is difficult, as before shown, in cities, it is a much easier matter with regard to vessels. This is shown in the report of Passed Assistant Surgeon Hobdy on the destruction of rats on vessels in the harbor of San Francisco. Seagoing vessels are the homes of millions of rats.

And it is due chiefly to rats on vessels that the plague has spread in the last few years from one country to another until to-day it may be fairly called a pandemic. While in 1894 and 1895 there was but one country infected, since those years 51 countries have been infected. Since the plague is carried by rats, and rats are carried from one country to another by vessels, and 51 countries have thus become infected with plague, and since the destruction of rats on vessels is a practicable procedure, it would seem a reasonable proposition to bring about an international agreement for the destruction of rats

on vessels in all the harbors of the civilized world. This might be accomplished by an agreement requiring a periodical fumigation of all vessels, enforced at all ports by the consuls of the government to which the vessels belong, certificates of said fumigation to be given the master of the vessel by the consuls, and the fumigation to be performed at the port where the vessel unloads. Since some vessels never entirely unload, fractional fumigation of said vessels could be enforced with regard to the empty compartments, leaving the other compartments for subsequent fumigation when empty. It is believed feasible to work out the necessary details of such a plan, either through a special international sanitary conference or through the International Office of Public Hygiene, at Paris, and the International Sanitary Bureau of the American Republics, both of which have been described in the foregoing pages. These two bureaus, by the action of each, have been brought into relation with one another, the first representing European countries and the second the republics of the American continent.

It was with a view to having a basis for a proposition of this character that there was prepared by an officer of the bureau and published, a monograph entitled "The Present Pandemic of Plague," giving in detail the constant geographical spread of this disease since 1894.

Special attention is invited to three institutions of the service mentioned in this report, viz: First, the Fort Stanton (N. Mex.) Sanatorium for the reception of tuberculosis patients of the service. The results of the open-air treatment are noteworthy, and the service is now reaping some of the benefits of its efforts to sustain this institution in part by the products of the farm and dairy and by the herd of beef cattle. This herd, numbering now some fifteen hundred head, is maintained upon the large range provided by the reservation and supplies the beef necessary for the station.

Second, the leprosy investigation station, at Molokai, Hawaiian Islands. The buildings are now about completed, but while awaiting their construction the director has been engaged in a scientific investigation of the disease, particularly with reference to cases in the first stage before their segregation on the island of Molokai. His reports already show considerable progress in his investigation, and the bureau is encouraged in the belief that this institution will be successful in its legalized quest with regard to leprosy and its treatment. So far as can be ascertained, this institution, established by the liberality of Congress, is the first organized effort of any government to continuously pursue the objects above mentioned until success shall have been achieved.

Third, the hygienic laboratory, the work of which is portrayed in the foregoing pages, has become firmly established as a scientific center of research in regard to contagious and infectious diseases. The personnel of the laboratory number, all told, 52, and its recent reports, particularly upon typhoid fever and the relation of milk to the public health, have been recognized, both in the United States and abroad, as standard works on the subjects named.

Another matter suggested by the foregoing report is the great awakening of public sentiment in the United States concerning public health matters. While state and municipal health authorities and many voluntary organizations are giving great attention to the

suppression of the communicable diseases, which are constantly with us, particularly typhoid fever and tuberculosis, there is an earnest demand that the National Government should take its legitimate part in the suppression of these diseases. While the obligations of the States and municipalities are fully recognized, attention is being directed constantly to the obligations of the National Government in the matter of investigation and the dissemination of information and interstate protective measures.

The pollution of interstate waters which furnish the ordinary water supply of many cities and towns, is one of the foremost sanitary subjects of the day. The solution of the matter requires careful investigation and study.

This and other like matters have been under special consideration in the bureau, and the measures deemed necessary or advisable at the present time and which should be undertaken by the Public Health and Marine-Hospital Service have been embodied in a bill which has passed the Senate and is on the House Calendar.

With regard to the personnel of the service, it may be said that the foregoing pages demonstrate the high scientific attainments of the corps, as well as the great administrative and executive efficiency of its members when placed in charge of critical epidemic situations or of broad measures of sanitary reform. To maintain the efficiency of the corps and its esprit and to assure that new admissions thereto shall be from among the most highly qualified medical candidates, it is essential that the compensation, as now fixed by law, be increased to meet the necessities of modern living, these salaries being practically the same as provided twenty years or more ago. This increase is further made necessary because of the increase provided for the medical officers of other departments and to prevent a consequent disadvantage to this service if its officers do not receive compensation equivalent to that given to officers holding analagous positions.

A bill providing as above has already passed the Senate and is awaiting final action by the House of Representatives.

The financial statement and the usual statistical tables relating to the professional care of seamen and physical examinations are appended.

I have the honor to remain, respectfully,

WALTER WYMAN,
Surgeon-General.

HON. GEORGE B. CORTELYOU,
Secretary of the Treasury.

APPENDIX.

FINANCIAL STATEMENT.

RECEIPTS AND EXPENDITURES, PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE, FOR THE FISCAL YEAR ENDED JUNE 30, 1908.

PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE, 1908.

	Appropriations and repayments.	Expenditures.	Balances June 30, 1908.
Pay and commutation, commissioned officers and pharmacists.	\$300,000.00	\$274,260.49	\$25,739.51
Pay, other employees.....	335,000.00	319,299.80	15,700.20
Freight and traveling expenses:			
Appropriation.....	\$35,000.00		
Repayments.....	610.74		
	35,610.74	23,210.96	12,399.78
Fuel, light, and water.....	80,000.00	67,132.50	12,867.50
Furniture and repairs.....	9,000.00	5,544.21	3,455.79
Purveying depot purchases:			
Appropriation.....	\$35,000.00		
Repayments.....	4,850.65		
	39,850.65	39,615.48	235.17
Rent, purveying depot.....	3,250.00	3,250.00	
Maintaining hygienic laboratory.....	15,000.00	9,831.20	5,168.80
Maintenance marine hospitals:			
Appropriation.....	\$220,000.00		
Repayments.....	10,314.15		
	230,314.15	217,168.22	13,145.93
Care of seamen and other purposes:			
Appropriation.....	\$155,000.00		
Repayments.....	1,329.41		
	156,329.41	125,045.56	31,283.85
Bureau, books.....	500.00	424.81	75.19
Total:			
Appropriation.....	\$1,187,750.00		
Repayments.....	17,104.95		
	^a 1,204,854.95	^b 1,084,783.23	120,071.72

^a \$150,000.00 } included on account of Immigration Service.
^b \$134,295.43 }

Outstanding liabilities, estimated..... \$13,149.73
For expenditures by stations, see Statistical Table II.

QUARANTINE SERVICE, 1908.

Amount of appropriation.....	\$355,000.00
Repayments, subsistence furnished, etc.....	509.11
 Total.....	 355,509.11
Expenditures.....	342,390.92
 Balance June 30, 1908.....	 13,118.19
Outstanding liabilities, estimated.....	7,960.18

Expenditures by stations.

Name of station.	Pay and allowance officers and employees.	Subsistence and miscellaneous.	Medical and hospital supplies.	Total.
Alexandria, Va.....	\$260. 00	\$26. 98		\$286. 98
Beaufort, S. C.....	1,500. 00	118. 55	\$24. 74	1,643. 29
Biscayne Bay.....	2,358. 83	915. 32	20. 28	3,294. 43
Boca Grande.....	3,150. 00	567. 87	19. 18	3,737. 05
Brunswick.....	3,066. 66	1,404. 54	43. 66	4,514. 86
Cape Charles.....	8,758. 83	5,547. 44	131. 03	14,437. 30
Cape Fear.....	6,541. 83	2,843. 35	222. 53	9,607. 71
Cedar Key.....	778. 00			778. 00
Charleston, S. C.....	5,886. 83	2,856. 27	107. 01	8,850. 11
Columbia River.....	9,870. 66	5,788. 85	121. 34	15,780. 85
Coos Bay, Oreg.....	166. 67	50. 94		217. 61
Cumberland Sound.....	3,690. 00	397. 00		4,087. 00
Delaware Breakwater.....	4,452. 84	1,982. 90		6,435. 74
Eureka.....	1,539. 00	1,638. 43	2. 15	3,179. 58
Florence, Oreg.....	200. 00			200. 00
Georgetown, S. C.....	1,200. 00	1. 95	6. 05	1,208. 00
Gulf.....	11,963. 15	5,618. 95	190. 93	17,773. 03
Hawaii.....	31,210. 28	10,001. 75	49. 94	41,261. 97
Key West.....	4,080. 00	505. 51		4,585. 51
Miscellaneous.....		785. 02	4. 30	789. 32
Newbern, N. C.....	200. 00			200. 00
Newport, Oreg.....	200. 00			200. 00
Pensacola.....	8,352. 84	4,653. 55	422. 98	13,429. 37
Perth Amboy, N. J.....	1,609. 59	893. 26	24. 85	2,527. 70
Port Harford, Cal.....	1,280. 00			1,280. 00
Port Inglis.....	500. 00	. 41		500. 41
Portland, Me.....	7,200. 00	1,734. 29	18. 30	8,952. 59
Porto Rico.....	22,199. 44	7,651. 30	109. 89	29,960. 63
Port Royal, S. C.....	1,500. 00	283. 06	6. 15	1,789. 21
Port Townsend.....	15,039. 50	2,660. 12	235. 33	17,934. 95
Punta Rassa.....	300. 00	2. 58	2. 76	305. 34
Reedy Island.....	13,381. 57	11,116. 74	317. 03	24,815. 34
St. George Sound.....	3,160. 00	344. 00		3,504. 00
St. Johns River.....	2,004. 17	768. 57		2,772. 74
San Diego.....	5,767. 00	2,659. 90	38. 96	8,465. 86
San Francisco.....	21,347. 62	22,663. 26	569. 26	44,580. 14
San Pedro.....	490. 00	606. 29	26. 32	1,122. 61
Santa Barbara.....	645. 00	. 56		645. 56
Savannah.....	11,328. 45	5,218. 00	74. 29	16,620. 74
South Atlantic.....	6,006. 01	2,503. 27		8,509. 28
Tampa Bay.....	7,520. 87	3,330. 06	122. 18	10,973. 11
Washington, N. C.....	633. 00			633. 00
Total.....	231,338. 64	108,140. 84	2,911. 44	342,390. 92

PREVENTING THE SPREAD OF EPIDEMIC DISEASES.

Balance July 1, 1907.....	\$379,803. 17
Amount appropriated by Congress.....	700,000. 00
Total.....	1,079,803. 17
Expenditures:	
Foreign medical service, salaries, and miscellaneous, China, Japan, Italy, etc., Central and South America and West Indies.....	\$53,175. 71
Panama and Canal Zone, salaries, etc.....	12,687. 82
Habana, Cuba (including outlying district), salaries, subsistence, supplies, and miscellaneous.....	21,427. 16
Mexico, salaries, supplies, etc.....	6,714. 64
Sanitary inspection in United States, salaries, traveling expenses, and miscellaneous.....	11,567. 79
Plague suppressive measures, Pacific coast.....	228,337. 22
Yellow fever, maintenance of detention camps, precaution against outbreak, salaries, medical and hospital supplies, disinfectants, etc.....	29,068. 49
Texas border inspection, salaries and miscellaneous.....	5,816. 76
	368,795. 59
Balance June 30, 1908.....	711,007. 58
Outstanding liabilities, estimated.....	118,000. 00

NATIONAL QUARANTINE AND SANITATION.

Balance July 1, 1907	\$456, 225. 48
Repayments, subsistence furnished, etc	525. 20
Total	456, 750. 68
Expenditures for salaries, supplies, improvements, and miscellaneous:	
Mobile Bay	\$34, 133. 97
New Orleans	39, 652. 15
Rigolets	1, 907. 14
Lake Borgne	250. 00
Calcasieu	875. 00
Atchafalaya	875. 00
Charleston	9, 483. 93
Beaufort	125. 00
Port Royal	125. 00
Georgetown	117. 18
Miscellaneous	539. 63
	88, 084. 00
Balance June 30, 1908	368, 666. 68
Outstanding liabilities, estimated	13, 000. 00

SALARIES, OFFICE OF SURGEON-GENERAL, PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE, 1908.

Amount of appropriation	\$39, 780. 00
Expenditures	39, 651. 83
Balance June 30, 1908	128. 17

MAINTENANCE LEPROSY HOSPITAL, HAWAII, 1908.

Balance July 1, 1907, reappropriated	\$38, 949. 21
Expenditures	10, 690. 68
Balance June 30, 1908	28, 258. 53

LEPROSY HOSPITAL, HAWAII, BUILDINGS AND EQUIPMENT.

Balance July 1, 1907	\$24, 875. 90
Retransferred by Supervising Architect	74, 813. 00
	\$99, 688. 90
Expended July 1, 1907, to June 30, 1908	41, 979. 83
Balance June 30, 1908	57, 709. 07

HYGIENIC LABORATORY, BUILDING AND GRADINGS.

Amount appropriated, act March 4, 1907	\$75, 000. 00
Amount transferred to Supervising Architect	75, 000. 00

APPROPRIATIONS, MARINE HOSPITALS.

Chicago, Ill., act March 3, 1905:	
Balance July 1, 1907	\$1, 132. 98
Balance June 30, 1908	1, 132. 98
Baltimore, Md., act March 4, 1907:	
Amount appropriated	4, 000. 00
Expended July 1, 1907, to June 30, 1908	3, 885. 20
Balance June 30, 1908	114. 80

Boston, Mass., act March 4, 1907:

Amount appropriated-----	\$6,000.00
Expended July 1, 1907, to June 30, 1908-----	3.24
Balance June 30, 1908-----	5,996.76

Cleveland, Ohio, act March 4, 1907:

Amount appropriated-----	3,000.00
Balance June 30, 1908-----	3,000.00

Key West, Fla., act March 4, 1907:

Amount appropriated-----	3,000.00
Expended July 1, 1907, to June 30, 1908-----	2,949.35
Balance June 30, 1908-----	50.65

New Orleans, La., act March 4, 1907:

Amount appropriated-----	4,000.00
Expended July 1, 1907, to June 30, 1908-----	3,975.70
Balance June 30, 1908-----	24.30

APPROPRIATIONS, QUARANTINE STATIONS.

Reedy Island:

Balance July 1, 1907, act April 28, 1904-----	\$75.01
Balance June 30, 1908-----	75.01

Gulf:

Balance July 1, 1907, act March 3, 1905-----	66.80
Amount transferred to Supervising Architect-----	66.80
Balance July 1, 1907, act March 3, 1889-----	329.91
Amount transferred to Supervising Architect-----	329.91
Amount appropriated, act March 4, 1907-----	35,492.00
Amount transferred to Supervising Architect-----	\$28,100.00
Expended July 1, 1907, to June 30, 1908-----	1,467.00
	29,567.00
Balance June 30, 1908-----	5,925.00

San Francisco:

Balance July 1, 1907, act March 3, 1905-----	395.17
Balance June 30, 1908-----	395.17
Balance July 1, 1907, act June 6, 1900-----	4,777.06
Balance June 30, 1908-----	4,777.06
Balance July 1, 1907, act June 30, 1906-----	8,274.57
Expended July 1, 1907, to June 30, 1908-----	\$2.24
Outstanding liabilities-----	906.92
	909.16
Balance June 30, 1908-----	7,365.41

Port Townsend:

Balance July 1, 1907, act March 3, 1905-----	940.00
Balance June 30, 1908-----	940.00
Balance July 1, 1907, act March 3, 1901-----	39,914.67
Balance June 30, 1908-----	39,914.67

Savannah:

Balance July 1, 1907, act June 6, 1900-----	\$112. 20
Balance June 30, 1908-----	112. 20
Balance July 1, 1907, act April 28, 1904-----	325. 00
Balance June 30, 1908-----	325. 00
Amount appropriated, act March 4, 1907-----	500. 00
Expended July 1, 1907, to June 30, 1908-----	498. 60
Balance June 30, 1908-----	1. 40

Key West, Mullet Key:

Balance July 1, 1907, act June 6, 1900-----	20, 936. 52
Expended July 1, 1907, to June 30, 1908-----	939. 69
Balance June 30, 1908-----	19, 996. 83

South Atlantic:

Balance July 1, 1907, act June 28, 1902-----	2, 795. 60
Balance June 30, 1908-----	2, 795. 60

Boca Grande:

Balance July 1, 1907, act June 28, 1902-----	500. 00
Balance June 30, 1908-----	500. 00
Balance July 1, 1907, act June 30, 1906-----	3, 000. 00
Expended July 1, 1907, to June 30, 1908-----	3, 000. 00
Amount appropriated act March 4, 1907-----	5, 000. 00
Amount transferred to Supervising Architect-----	5, 000. 00

Pensacola:

Amount appropriated, act March 4, 1907-----	24, 600. 00
Amount transferred to Supervising Architect-----	\$17, 000. 00
Expended July 1, 1907, to June 30, 1908-----	4, 988. 00
	21, 988. 00
Balance June 30, 1908-----	2, 612. 00

San Diego:

Balance July 1, 1907, act March 3, 1903-----	6, 000. 00
Balance June 30, 1908-----	6, 000. 00
Amount appropriated, act March 4, 1907-----	1, 850. 00
Expended July 1, 1907, to June 30, 1908-----	1, 845. 00
Balance June 30, 1908-----	5. 00

Delaware Breakwater:

Amount appropriated, act March 4, 1907-----	1, 800. 00
Outstanding liabilities-----	943. 00
Balance June 30, 1908-----	857. 00

Honolulu:

Amount appropriated, act March 4, 1907-----	2, 500. 00
Expended July 1, 1907, to June 30, 1908-----	2, 109. 48
Balance June 30, 1908-----	390. 52

Portland, Me.:

Amount appropriated, act March 4, 1907-----	\$2,183.00
Amount transferred to Supervising Architect-----	2,183.00

BALANCES OF APPROPRIATIONS CARRIED TO SURPLUS FUND.

Reedy Island, act March 3, 1905-----	\$125.77
Reedy Island, act March 3, 1901-----	660.20
Mayport, Fla., act June 28, 1902-----	1,500.00
Miami, Fla., act June 28, 1902-----	228.59
Biscayne Bay, act June 30, 1906-----	20.32
San Diego, act June 28, 1902-----	18.55
Cape Charles, act March 3, 1899-----	475.00

ACCOUNTS.

VOUCHERS PASSED FOR PAYMENT AND SETTLEMENT.

The records of the bureau show that 17,477 vouchers were passed during the year. Of this number, 15,182 were sent to the disbursing clerk for payment, 1,020 were transmitted to the Auditor for the Treasury Department for examination and settlement, and 1,275 were examined and referred to the auditor, they having previously been paid by special disbursing agents of the service

STATISTICAL TABLES.

TABLE I.—COMPARATIVE TABLE OF NUMBER OF PATIENTS ANNUALLY TREATED—
1868 TO 1908.

Fiscal year.	Number of sick and disabled seamen furnished relief.	Fiscal year.	Number of sick and disabled seamen furnished relief.
Prior to reorganization:		After reorganization—Continued.	
1868.....	11, 535	1888.....	48, 203
1869.....	11, 356	1889.....	49, 518
1870.....	10, 560	1890.....	50, 671
After reorganization:		1891.....	52, 992
1871.....	14, 256	1892.....	53, 610
1872.....	13, 156	1893.....	53, 317
1873.....	13, 529	1894.....	52, 803
1874.....	14, 356	1895.....	52, 643
1875.....	15, 009	1896.....	53, 804
1876.....	16, 808	1897.....	54, 477
1877.....	15, 175	1898.....	52, 709
1878.....	18, 223	1899.....	55, 489
1879.....	20, 922	1900.....	56, 355
1880.....	24, 860	1901.....	58, 381
1881.....	32, 613	1902.....	56, 310
1882.....	36, 184	1903.....	58, 573
1883.....	40, 195	1904.....	58, 556
1884.....	44, 761	1905.....	57, 013
1885.....	41, 714	1906.....	54, 363
1886.....	43, 822	1907.....	55, 129
1887.....	45, 314	1908.....	54, 301

TABLE II.—EXHIBIT OF THE OPERATIONS OF THE SERVICE DURING THE FISCAL YEAR ENDED JUNE 30, 1908.

Port.	Total number of sea-men treated.	Patients in hos-pital July 1, 1907.	Admit-ted dur-ing the year.	Total number treated in hos-pital.	Dis-charged.	Died.	Remain-ing in hos-pital June 30, 1908.	Number of days' relief in hos-pital.	Number of sea-men fur-nished office re-lief.	Number of times office re-lief was fur-nished.	Number of persons ex-amin-ed physi-cally, in-clud-ing pilots.	Num-ber of foreign sea-men treated.	Days' hos-pital relief fur-nished foreign sea-men.	Amount expended.
Grand total	54,301	1,051	13,727	14,778	13,227	514	1,037	426,957	39,523	68,582	5,210	956	10,120	\$1,084,783.23
Albany, N. Y.	3		3	3				38			4			143.70
Apalachicola, Fla.	35		19	19	19			317	16	35				794.55
Ashland, Wis.	62		6	6	6			209	56	63		11		312.45
Ashtabula, Ohio.	148	2	13	15	15			272	133	252	11			592.35
Astoria, Oreg.	165	2	42	44	41	3		666	121	195	44			1,335.59
Baltimore, Md.	1,784	45	660	705	640	17	48	22,448	1,079	1,467	239			29,527.18
Bangor, Me.	79	2	23	25	21	2	2	279	54	70	23			896.94
Barnstable, Mass., and subports.	22								22	66				69.00
Bath, Me.	27								27	32	2			314.80
Beaufort, N. C.	52		2	2	2				50	74	44			449.87
Beaufort, S. C.	32							9	32	40				66.30
Bellingham, Wash.	70		15	15	14	1		150	55	141		13	121	469.90
Boothbay Harbor, Me.	91		8	8	8			87	83	133	7			459.10
Boston, Mass.	2,823	44	802	846	778	15	53	22,101	1,977	3,355	221	86	722	35,373.53
Bridgeport, Conn.	7		7	5	1	1		112						112.00
Brownsville, Tex.														25.00
Brunswick, Ga.	187		49	49	49			493	138	177		8	52	817.61
Buffalo, N. Y.	1,855	17	370	387	359	9	19	6,624	1,468	2,167	31			15,199.82
Burlington, Iowa.	19		18	18	16	1	1	326	1	1				327.00
Cairo, Ill.	564	13	255	268	244	9	15	5,378	296	419	1			15,524.77
Cambridge, Md.	64		39	39	34	3	2	713	25	31				1,024.89
Cedar Keys, Fla.	40								40	54				5.80
Charleston, S. C.	507	3	40	43	43			384	464	628	32			1,609.79
Chatanooga, Tenn.	16		15	15	13		2	255	1	1				390.00
Chicago, Ill.	2,316	39	474	513	452	17	44	17,266	1,803	2,258	101			35,159.61
Cincinnati, Ohio.	201	1	65	66	62	3	1	708	135	235	25			3,279.46
Cleveland, Ohio.	2,077	40	506	546	478	25	43	16,191	1,531	2,308	64	1	9	20,384.03
Corpus Christi, Tex.	6		2	2	2			36	4	23	4			414.10
Crisfield, Md.	104								104	205	3			312.00
Darien, Ga.														200.00
Delaware Breakwater	49		1	1			1							5.90
Detroit, Mich.	1,415	18	296	314	287	7	20	8,735	1,101	2,061	46			19,590.75
Dubuque, Iowa.	6		3	3	3			37	3	3	11			510.96
Duluth, Minn.	254	2	33	35	28	3	4	751	219	246	20			1,142.33
Eastport, Me.	6		5	5	5			7	1	1				31.25
Edenton, N. C.	78		2	2	2			18	76	124				160.00

TABLE II.—EXHIBIT OF THE OPERATIONS OF THE SERVICE DURING THE FISCAL YEAR ENDED JUNE 30, 1908—Continued.

Port.	Total number of sea-men treated.	Patients in hos-pital July 1, 1907.	Admit-ted dur-ing the year.	Total number treated in hos-pital.	Dis-charged.	Died.	Remain-ing in hos-pital June 30, 1908.	Number of days' relief in hos-pital.	Number of sea-men fur-nished office re-lief.	Number of times office re-lief was fur-nished.	Number of persons ex-amin-ed physi-cally, in-cluding pilots.	Num-ber of foreign seamen treated.	Days' hos-pital fur-nished foreign seamen.	Amount expended.
Edgartown, Mass.	1								1	1				\$1.75
Elizabeth City, N. C.	39								39	49				300.00
Ellsworth, Me.	7								7	21				304.99
El Paso, Tex.														58.00
Erie, Pa.	231	11	44	55	49	3	3	1,082	176	214	10			1,994.65
Escanaba, Mich.	89	1	11	12	12			147	77	77				458.39
Eureka, Cal.	98	1	34	35	33	2		353	63	81	15	4	57	1,044.65
Evansville, Ind.	464	10	114	124	110	5	9	3,439	340	400	6			12,370.28
Fernandina, Fla.	98		12	12	9			177	86	111				599.90
Fort Stanton, N. Mex.	369	186	183	369	91	84	194	70,580						116,786.97
Gallipolis, Ohio.	176	3	64	67	64	1	2	1,207	109	258	15			1,907.23
Galveston, Tex.	657	5	195	200	183	4	13	2,926	457	675	187			7,038.25
Georgetown, S. C.	221	3	63	66	61	1	4	708	155	266	6			1,915.72
Gloucester, Mass.	270	1	20	21	19	2		432	249	393	36			1,245.97
Government Hospital for Insane.	41	35	6	41	1	2	38	12,845						8,277.50
Grand Haven, Mich.	24		11	11	10	1		78	13	23	85			417.10
Green Bay, Wis.	85	2	8	10	10			185	75	85	19			574.00
Hartford, Conn.	11		11	11	9			181						197.00
Honolulu, Hawaii.	584	17	187	204	187	6	11	5,834	380	701	19			12,353.25
Honolulu, Wash.	105	1	58	59	56	2	1	1,072	46	47	7			2,141.27
Houghton, Mich.	7	1	6	7	7			118			14			440.40
Hygienic Laboratory														67,946.31
Immigration Service														134,285.43
Irrington, Va.	113		4	4	4			27	109	100				380.60
Jacksonville, Fla.	320	1	85	87	80	3	3	1,259	234	248	8			2,650.25
Juneau, Alaska.	68	1	18	19	18	1		313	49	79	1			1,602.60
Kansas City, Mo.	2								2	8				1,128.65
Ketchikan, Alaska.	110	1	17	18	16	2		227	92	131		1	2	1,549.73
Key West, Fla.	344	10	88	98	90	2	6	2,892	246	322	24	15	186	10,347.78
La Crosse, Wis.	91	1	5	6	6			53	85	141	2			595.50
Life-Saving Service, examinations by officers specially detailed.											435			
Little Rock, Ark.	30		2	2	1	1		21	28	49				289.54
Los Angeles, Cal.	389	13	136	149	129	3	17	3,995	240	490		11	114	12,390.04
Louisville, Ky.	879	12	239	251	228	7	16	6,050	628	1,176	20	1		15,061.38
Ludington, Mich.	28		3	3	3			58	25	37	49			229.65
Machias, Me.	37		6	6	5	1		166	31	44	64			567.00
Manistee, Mich.	80	2	10	12	12			210	68	92	22			648.08

Manitowoc, Wis.	96	1	32	33	30	1	2	608	63	78	11		996.49
Marquette, Mich.	105		7	7	7			169	98	111	23		536.01
Memphis, Tenn.	1,984	11	449	460	433	19	8	5,393	1,524	1,967	30		16,186.21
Menominee, Mich.	22		2	2	2			4	20	28			356.58
Milwaukee, Wis.	1,190	7	220	227	207	6	14	4,063	963	1,627	125		7,226.57
Miscellaneous.													1,096.55
Mobile, Ala.	1,121	20	378	398	370	11	17	7,183	723	950	72	99	16,286.87
Nashville, Tenn.	83		5	5	5			135	78	145	13		501.60
Natchez, Miss.	82		4	4	4			53	78	198	1		447.55
New Bedford, Mass.	52		6	6	5	1		59	46	91	2		399.90
Newbern, N.C.	218	1	31	32	31	1		250	186	376	17		951.35
New Haven, Conn.	36	2	9	11	11			246	25	41	19		724.00
New London, Conn.	114	3	29	32	30		2	694	82	89	27		1,854.15
New Orleans, La.	2,004	44	530	574	524	21	29	12,804	1,431	1,961	81	114	27,836.52
Newport, Ark.	56								56	97			388.55
Newport, R. I.	57	3	36	39	37		2	808	18	23	22		1,528.25
Newport News, Va.	159								159	175	70		405.69
New York, N. Y.	3,819	87	1,229	1,316	1,178	42	96	35,091	2,503	9,373	324	259	49,692.75
Nome, Alaska.	52	3	26	29	25		4	649	23	114			3,224.00
Norfolk, Va.	2,421	19	581	600	571	11	18	9,465	1,821	2,222	149		15,158.44
North Bend, Oreg.	67	2	38	40	36	2	2	703	27	34	17		1,489.76
Ogdensburg, N. Y.	32		10	10	10			153	22	59	6		453.79
Oswego, N. Y.	49		7	7	7			91	42	101			274.35
Paducah, Ky.	107		9	9	9			96	98	215	1		480.90
Pensacola, Fla.	145		30	30	27	3	1	458	115	415	21		1,158.20
Philadelphia, Pa.	2,403		545	545	519	7	19	7,601	1,858	2,509	243		14,247.12
Philippine Islands.											198		
Pittsburg, Pa.	858	13	187	200	188	6	6	3,317	658	1,002	51		8,558.21
Ponce, P. R.	34		6	6	6			158	28	56			197.50
Port Arthur, Tex.	16								16	26			97.18
Port Huron, Mich.	97	1	2	3	3			23	94	235	40		334.50
Portland, Me.	757	33	266	299	275	10	14	11,119	458	677	65	36	21,352.72
Portland, Oreg.	802	5	189	194	180	4	10	3,542	608	995	15		9,260.41
Portsmouth, N. H.	30	1	9	10	10			226	20	20	30		427.15
Port Tampa, Fla.	144	4	44	48	47	1		1,119	96	249	11		1,934.83
Port Townsend, Wash.	579	32	384	416	378	11	27	15,464	163	343	48	40	18,603.94
Providence, R. I.	471	3	64	67	59	5	3	925	404	662	45		2,440.89
Provincetown, Mass.	96								96	158	43		258.15
Purveying Depot.													49,276.17
Railroad transportation, freight charges, etc.													
Revenue-cutter vessels, cruises of.	2,227								2,227	5,327	298	75	9,208.67
Richmond, Va.	57		7	7	6		1	185	30	77			7,208.34
Rockland, Me.	170	1	4	5	4	1		29	165	463	21		494.61
Sag Harbor, N. Y.	5								5	9			541.25
Saginaw, Mich.	121	2	25	27	25	1	1	444	94	119	6		8.75
Salem, Mass.	20		1	1	1			10	19	19			754.66
San Diego, Cal.	87	2	20	22	21	1		524	65	126	4	11	34.00
Sandusky, Ohio.	60		4	4	4			27	56	78	9		2,806.32
San Francisco, Cal.	2,926	110	1,218	1,328	1,173	45	110	46,753	1,598	2,939	423	113	50,176.69

TABLE II.—EXHIBIT OF THE OPERATIONS OF THE SERVICE DURING THE FISCAL YEAR ENDED JUNE 30, 1908—Continued.

Port.	Total number of sea-men treated.	Patients in hos-pital July 1, 1907.	Admit-ted dur-ing the year.	Total number treated in hos-pital.	Dis-charged.	Died.	Remain-ing in hos-pital June 30, 1908.	Number of days' relief in hos-pital.	Number of sea-men fur-nished office re-lief.	Number of times office re-lief was fur-nished.	Number of persons ex-amin-ed physi-cally in-cluding pilots.	Num-ber of foreign sea-men treated.	Days' hos-pital relief fur-nished foreign sea-men.	Amount expended.
San Juan, P. R.	291	6	108	114	105	2	7	2,963	177	257	14	—	—	\$2,891.00
St. Louis, Mo.	895	25	224	249	220	6	23	7,621	646	948	81	—	—	14,682.89
St. Michael, Alaska.	24	—	5	5	5	—	—	19	19	34	2	—	—	476.10
St. Paul, Minn.	8	—	5	5	5	—	—	107	3	6	—	—	—	334.56
Sault Ste. Marie, Mich.	162	2	66	68	61	2	5	1,086	94	99	34	—	—	1,781.64
Savannah, Ga.	904	15	275	290	269	12	9	4,700	614	892	12	5	126	14,756.91
Seattle, Wash.	1,587	13	308	321	291	18	12	5,199	1,266	2,252	202	27	248	9,197.73
Sheboygan, Wis.	24	—	7	7	6	1	—	53	17	19	15	—	—	402.30
Sitka, Alaska.	40	2	8	10	9	—	1	131	30	35	—	—	—	475.15
Solomons, Md.	276	—	8	8	8	—	—	65	268	326	8	—	—	579.00
Special duty.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Superior, Wis.	646	4	106	110	105	—	5	1,883	536	858	—	—	—	15,641.95
Tacoma, Wash.	126	3	38	41	39	1	1	683	85	126	4	—	—	2,555.70
Tappahannock, Va., and subports.	72	—	—	—	—	—	—	—	72	74	—	—	—	1,412.15
Toledo, Ohio.	473	1	112	113	111	2	—	1,402	360	1,033	12	—	—	121.25
Traveling expenses.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Valdes, Alaska.	175	—	13	13	11	2	—	297	162	400	—	—	—	1,747.20
Vicksburg, Miss.	198	3	108	111	109	1	1	1,166	87	127	—	—	—	8,033.64
Vineyard Haven, Mass.	245	9	87	96	89	1	6	3,409	149	159	7	3	15	2,134.90
Washington, D. C. (Bureau)	—	—	—	—	—	—	—	—	—	—	—	—	—	7,925.89
Do.	134	1	18	19	19	—	—	405	115	179	21	—	—	30,646.23
Washington, N. C.	154	1	19	20	20	—	—	249	134	158	7	—	—	1,657.94
Wheeling, W. Va.	22	—	16	16	16	—	—	111	6	6	—	—	—	1,294.44
Wilmington, N. C.	484	10	105	115	105	3	7	2,774	369	579	54	1	4	411.00
Cape Charles Quarantine.	15	—	—	—	—	—	—	—	66	18	—	—	—	10,454.64
Cape Fear Quarantine.	66	—	—	—	—	—	—	—	—	124	3	—	—	—
Gulf Quarantine.	11	—	10	10	10	—	—	272	1	1	—	—	—	—
Reedy Island Quarantine.	1	—	—	—	—	—	—	—	1	1	—	—	—	—
San Francisco Quarantine.	10	—	10	10	9	—	1	277	—	—	—	—	—	—
San Francisco Quarantine.	14	—	14	14	14	—	—	68	—	—	—	14	68	—
Santa Rosa Quarantine.	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tampa Bay Quarantine.	1	—	1	1	1	—	—	11	—	—	2	—	—	—

TABLE III.—SUMMARY OF PHYSICAL EXAMINATIONS MADE BY OFFICERS OF THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE DURING THE FISCAL YEAR ENDED JUNE 30, 1908, EXCLUSIVE OF ALIEN IMMIGRANTS.

Summary of examinations and rejections.	Total.	Pilots.	Merchant sea-men.	Revenue-Cutter Service.	Life-Saving Service.	Coast and Geodetic Survey.	Light-House Service.	Foreign seamen.	Immigration Service.	Civil Service Commission.	Isthmian Canal Commission.	Philippine Islands.
Total number examined.....	5,210	1,036	274	1,645	1,686	97	36	10	21	146	19	240
Number passed.....	4,747	1,003	247	1,372	1,626	86	32	4	18	134	19	206
Number rejected.....	463	33	27	273	60	11	4	6	3	12	0	34
<i>Causes of rejection (disease, disability, etc.).</i>												
Abscess connective tissue.....	1		1									
Abscess over sacrum.....	1			1								
Albuminaria.....	6			4						2		
Alcoholism.....	1			1								
Appendicitis.....	2				2							
Bronchitis.....	6			5	1							
Catarrh.....	3			3								
Cocaine habit.....	2			2								
Color blindness.....	42	20	4	7	4							7
Conjunctivitis.....	1			1								
Chancroid.....	1			1								
Contusion of chest.....	1		1									
Curvature spine.....	5			5								
Defective hearing.....	1			1								
Defective teeth.....	17			16		1						
Defective vision.....	103	13	4	57	7	2				5		15
Deformity of chest.....	4			3		1						
Diabetes.....	1			1								
Diarrhœa.....	1		1									
Enlarged glands.....	2			2								
Enlarged tonsils.....	5			5								
Fistula right thigh.....	1			1								
Floating kidney.....	1				1							
Fracture arm.....	3			2	1							
Gastritis.....	5				5							
General debility.....	2				2							
Gonorrhœa.....	13		2	10		1						
Heart:												
Abnormal action of.....	8			5	2							1
Hypertrophy of.....	2						1		1			
Lesion of.....	1					1						
Mitral insufficiency.....	3											3
Mitral regurgitation.....	4			2			1					1
Organic disease of.....	4			3								1
Valvular disease of.....	15		1	8	1	1			1			3
Hernia.....	16			12	3							1
Hydrocele.....	3		1		2							
Influenza.....	2									2		
Itch.....	2			2								
Loss of finger.....	4			1	2		1					
Loss of toes.....	1			1								
Malaria.....	7			3				4				
Muscular atrophy.....	1											1
Myopia.....	3			3								
Nasal deformity.....	1			1								
Nervous weakness.....	1				1							
Obesity.....	1			1								
Orchitis.....	1			1								
Paralysis.....	1			1								
Paraphimosis.....	1			1								
Phimosis.....	1			1								
Piles.....	20			15	4	1						
Pleurisy.....	2			2								
Poor physique.....	10			10								
Rheumatism.....	6		2		3			1				
Rupture.....	1			1								
Scabies.....	6			6								
Short leg.....	1			1								
Soft chancre.....	7		2	4	1							
Strabismus, double.....	1			1								
Stricture of urethra.....	2		1	1								
Suppuration of glands.....	1			1								
Syphilis.....	10		3	6				1				
Tonsillitis.....	3			2	1							

TABLE III.—SUMMARY OF PHYSICAL EXAMINATIONS MADE BY OFFICERS OF THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE DURING THE FISCAL YEAR ENDED JUNE 30, 1908, EXCLUSIVE OF ALIEN IMMIGRANTS—Continued.

Summary of examinations and rejections.	Total.	Pilots.	Merchant sea-men.	Revenue-Cutter Service.	Life-Saving Service.	Coast and Geo-detic Survey.	Light-House Service.	Foreign seamen.	Immigration Service.	Civil Service Commission.	Isthmian Canal Commission	Philippine Is-lands.
<i>Causes of rejection (disease, disability, etc.—Continued.</i>												
Trachoma.....	2							1				1
Tuberculosis.....	17			11	3	1				1		1
Tumor of jaw.....	1			1								
Ulcer.....	5			5								
Undescended testicle.....	1			1								
Under development.....	6			5	1							
Underheight.....	4				3	1						
Underweight.....	9			2	6					1		
Varicocele.....	20			18	1	1						
Varicose veins.....	14			9	3		1			1		
Wound of finger.....	1			1								

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1908.

Disease.	Number of cases.								
	Remaining in hos-pital from pre-vious year.	Admitted during the year.	Recovered.	Improved.	Not im-proved.	Died.	Remaining in hos-pital at close of year.	Treated at dispen-sary.	Total treated in hos-pital and dis-pensary.
TOTAL CASES.....	1,051	13,727	7,899	5,029	299	514	1,037	39,523	54,301
General diseases.....	477	5,789	3,216	2,214	97	231	508	15,280	21,546
Smallpox.....		24	19	2	2		1	3	27
Cowpox.....		2		2				92	94
Chicken pox.....		9	4	3			2	2	11
Measles.....	2	54	50	3	2	1		11	67
Rubella.....		6	4	2				5	11
Scarlet fever.....		4	4					2	6
Plague.....		1				1			1
Relapsing fever.....								1	1
Dengue.....		9	8	1				4	13
Influenza.....	4	562	463	80	5	7	6	1,374	1,940
Whooping cough.....		1					1		1
Mumps.....		31	27	2			2	24	55
Diphtheria.....	1	30	18	3	2	3	5	7	38
Cerebrospinal fever.....		3		1		2			3
Simple continued fever.....	2	17	16	2		1		5	24
Enteric fever.....	32	515	405	38	2	52	50	22	569
Choleraic diarrhea.....		5	4	1					5
Epidemic diarrhea.....								22	22
Dysentery.....	2	66	37	23	1	2	5	103	171
Beriberi.....		12	9	2		1		6	18
Malarial fever:									
Intermittent.....	19	634	558	75	4	2	14	1,225	1,878
Remittent.....	8	186	160	19	5	1	9	75	269
Phagedena:									
Sloughing phagedena.....								1	1
Hospital gangrene.....		1	1						1
Erysipelas.....	3	38	33	5	1	1	1	17	58
Pyemia.....		2	1			1		2	4
Septicæmia.....		4	2			1		9	13
Tubercle.....	231	525	12	338	51	115	240	157	913

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1908—Continued.

Disease.	Number of cases.								
	Remaining in hos- pital from pre- vious year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hos- pital at close of year.	Treated at dispen- sary.	Total treated in hospital and dis- pensary.
Syphilis:									
Primary.....		54	2	47			5	186	240
Secondary.....	43	755		738	9	6	45	3,255	4,053
Tertiary.....		19	3	15			1	30	49
Gonorrhea.....	45	721	408	309	11		88	4,415	5,181
Diseases dependent on animal parasites.	5	65	57	11			2	448	518
Diseases dependent on vegetable para- sites.....		12	6	6				54	66
Effects of animal poisons.....	1			1				15	16
Decayed and poisonous food.....		1				1			1
Effects of vegetable poisons.....	1	9	7	2	1			37	47
Effects of inorganic poisons.....		6	4	2				7	13
Effects of the presence of foreign bodies.....		2	1	1				15	17
Effects of mechanical injuries.....	1	2	2	1				7	10
Effects of heat.....	1	12	11	1		1		10	23
Effects of cold.....		1	1						1
Effects of electricity.....								1	1
Effects of chemical agents.....		1	1					2	3
Effects of excessive exertions and strain.....								1	1
Surfeit.....								1	1
Starvation.....		13	12	1					13
Scurvy.....		6	1	5					6
Alcoholism.....	4	243	213	26		4	4	170	417
Delirium tremens.....								1	1
Rheumatic fever.....	4	131	92	39			4	27	162
Rheumatism.....	44	805	458	330		6	55	2,639	3,488
Gout.....		3	3					20	23
Osteoarthritis.....		7		7				3	10
Cyst.....	2	17	16	1	1		1	3	22
Sebaceous.....								35	35
Bursal.....								1	1
New growth, nonmalignant.....	4	38	29	11			2	149	191
New growth, malignant.....	10	32	11	8		15	8	12	54
Anæmia.....	2	8	3	7				31	41
Idiopathic anæmia.....	1	3	1	2			1		4
Purpura.....		1	1					1	2
Diabetes mellitus.....	2	11	1	6		5	1	41	54
Diabetes insipidus.....								1	1
Chlorosis.....		1	1						1
Congenital malformations.....		5	3				2	5	10
Debility.....	2	64	28	33		2	3	481	547
Old age.....	1			1				7	8
Local diseases.....	420	5,683	3,224	2,049	179	239	412	13,060	25,163
DISEASES OF THE NERVOUS SYSTEM...	108	329	106	153	38	26	114	833	1,270
Of the nerves—									
Inflammation—									
Neuritis.....	1	41	22	15	2		3	50	92
Multiple neuritis.....	4	6	1	4			5		10
Of the spinal cord and membranes—									
Cord—									
Inflammation—									
Diffuse.....		2	1	1					2
Local.....	3	4	2	4			1	2	9
Hemorrhage.....		2				2			2
Degeneration—									
Of anterior cornua.....	2	3		3		1	1		5
Of lateral columns.....		6					6		6
Of posterior columns.....	21	32	1	23	9	4	16	18	71
Of lateral and posterior col- umns.....	1	4			2		3		5
Of the brain and its membranes—									
Membranes—									
Inflammation of pia mater and arachnoid.....		2				1	1		2
Hemorrhage.....	1	2	1	1		1			3
Brain—									
Inflammation.....		1				1		2	3
Sclerosis.....								1	1
Softening.....		2		1			1		2

TABLE IV.--TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1908--Continued.

Disease.	Number of cases.								
	Remaining in hos- pital from pre- vious year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hos- pital at close of year.	Treated at dispen- sary.	Total treated in hospital and dis- pensary
DISEASES OF THE RESPIRATORY SYSTEM.	30	695	366	251	16	69	23	2,996	3,721
Hay fever.....								8	8
Tracheitis.....								41	41
Inflammation of mucous membrane of larynx—									
Catarrhal, acute.....	1	16	13		1	2	1	122	139
Membranous.....								1	1
Bronchitis—									
Catarrhal, acute.....	8	324	168	145	8	3	8	2,476	2,808
Catarrhal, chronic.....	2	30	9	16	3		4	54	86
Membranous.....								5	5
Spasmodic asthma.....	2	46	8	26		10	4	70	118
Congestion of lung.....		5	2	1		2		20	25
Hemorrhage of lung.....		3	1	2				3	6
Hæmoptysis.....								2	2
Pneumonia.....	8	157	104	20		40	1	9	174
Broncho-pneumonia.....	1	11	8	3		1		1	13
Abscess of lung.....		1		1					1
Chronic interstitial inflammation.....		1	1						1
Phthisis—									
Acute.....		3		1	2				3
Chronic.....		4		4				24	28
Tubercular.....		3			1	2			3
Pleurisy—									
Acute.....	6	77	49	25	1	5	3	130	213
Chronic.....		9	2	3		2	2	23	32
Empyema.....		3	1			2		1	4
Hydrothorax.....								1	1
Emphysema.....	1	2		3				5	8
Injury to lungs.....	1			1					1
DISEASES OF THE DIGESTIVE SYSTEM.	65	1,432	992	365	48	24	68	6,411	7,908
Inflammation of the lips.....								5	5
Ulceration of the lips.....								11	11
Fissure of the lips.....								2	2
Inflammation of the mouth.....		2	2					37	39
Ulceration of the mouth.....		5	3	2				16	21
Degeneration of the dental pulp.....								2	2
Inflammation of the dental pulp.....								4	4
Suppuration of the dental pulp.....								2	2
Caries of dentine and cementum.....		3	3					99	102
Necrosis of cementum.....								8	8
Inflammation of dental periosteum.....		2	2					5	7
Abscess of dental periosteum.....		14	8	6				31	45
Inflammation of gums and alveoli.....								16	16
Suppuration of alveoli.....		1	1					13	14
Ulceration of gums and alveoli.....		2	2					5	7
Caries of the alveoli.....		2	1	1				10	12
Toothache.....								81	81
Necrosis alveoli.....		2	1	1				5	7
Malposition teeth.....								2	2
Inflammation of the tongue.....								3	3
Ulceration of the tongue.....		3	2		1			3	6
Sore throat.....		21	16	5				198	219
Inflammation of the tonsils—									
Follicular.....	3	153	121	32			3	644	800
Suppuration.....		10	9	1				18	28
Hypertrophy of tonsils.....		4	4					10	14
Elongated uvula.....		3	3					11	14
Inflammation of salivary glands.....		2	1	1				5	7
Salivation.....		1	1					1	2
Inflammation of the pharynx—									
Catarrhal.....	2	28	26	4				259	289
Granular.....								4	4
Follicular.....		4	4					1	5
Ulcer of pharynx.....		2	1	1				4	6
Post-pharyngeal abscess.....		2	1	1					2
Perforation duodenum.....		1				1			1
Inflammation of the stomach.....								24	24
Catarrhal.....	6	134	63	57	6	7	7	476	616
Ulceration of the stomach—									
Superficial.....	2	13	3	9	2		1	15	30
Perforating.....		1		1					1

TABLE IV. —TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1908—Continued.

Disease.	Number of cases.								
	Remaining in hos- pital from pre- vious year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hos- pital at close of year.	Treated at dispen- sary.	Total treated in hospital and dis- pensary.
DISEASES OF THE DIGESTIVE SYSTEM— Continued.									
Hæmorrhage of the stomach.....		1		1				4	5
Dilatation of the stomach.....	1	7	5	2			1	6	14
Indigestion.....	3	132	89	39	4		3	1,327	1,462
Pyrosis.....								12	12
Nausea.....								8	8
Vomiting.....								24	24
Gastralgia.....	1	5	6					19	25
Heartburn.....								5	5
Loss of appetite.....								29	29
Stricture pylorus.....	1		1					2	3
Inflammation of the intestines—									
Enteritis.....	2	61	42	11		5	5	69	132
Typhilitis.....	7	88	68	18		2	7	32	127
Colitis.....	1	11	9	3				24	36
Catarrhal.....		33	27	3		1	2	72	105
Ulceration of the intestines.....								2	2
Fæcal accumulation.....		6	5	1				3	9
Hernia.....	10	182	146	20	16		10	500	692
Obstruction of the intestines.....		2	2						2
Intestinal dyspepsia.....		5	3	2				12	17
Constipation.....	2	43	32	11	1		1	1,146	1,191
Colic.....	1	13	13				1	30	44
Diarrhoea.....	7	128	102	25	2	2	4	487	622
Enteralgia.....								13	13
Inflammation of the rectum.....		1					1	7	8
Periproctitis.....	1	4	2	2			1	14	19
Abscess.....	2	27	16	11	2			9	38
Fissure of the anus.....		3	2	1				7	10
Fistula in ano.....	4	55	32	18	2	1	6	30	89
Prolapse of the rectum.....		6	3	2	1			2	8
Ulcer rectum.....		1					1	2	3
Piles, internal.....		33	20	9	2		2	53	86
Piles, external.....		37	21	12	3		1	153	190
Piles, mixed.....	1	32	20	7	3		3	38	71
Pruritus ani.....								24	24
Inflammation of the liver, acute.....		11	3	6	1		1	28	39
Inflammation of the liver, acute suppuration.....		4		3	1			2	6
Inflammation of the liver, acute abscess.....	2	1	1	1			1		3
Inflammation of the liver, chronic.....	1	18	1	17		1		8	27
Hyperæmia of the liver.....		13	11	2				97	110
Hypertrophy of the liver.....								3	3
Jaundice.....	1	23	17	6		1		34	58
Inflammation of hepatic ducts and gall bladder.....	1	17	7	8			3	9	27
Calculi.....	3	1	1	1		2		15	19
Biliary colic.....		5	4	1				4	9
Inflammation of the peritoneum.....		3	1			1	1	2	5
Dropsy.....		4	1		1		2	2	6
Perforation gall bladder.....		1	1					12	13
DISEASES OF THE LYMPHATIC SYSTEM.....	17	392	236	139	5	1	28	448	857
Splenitis.....		1		1					1
Congestion of spleen.....								1	1
Inflammation of lymph glands.....	14	329	201	112	5	1	24	379	722
Suppuration.....	3	47	23	23			4	52	102
Hypertrophy of lymph glands.....								7	7
Inflammation of lymphatics.....		10	8	2				7	17
Suppuration.....		5	4	1				2	7
DISEASES OF THE THYROID BODY.....		3		2	1			6	9
Inflammation.....								1	1
Goiter.....		3		2	1			5	8
DISEASES OF THE SUPRARENAL CAP- SULES.....								1	1
Addison's disease.....								1	1
DISEASES OF THE URINARY SYSTEM.....	15	211	51	112	5	42	16	441	667
Acute nephritis.....		35	10	16		6	3	27	62
Bright's disease.....									
Chronic nephritis.....	10	76		50		30	6	94	180
Granular kidney.....		14		4	3	5	2	18	32

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1908—Continued.

Disease.	Number of cases.								
	Remaining in hos- pital from pre- vious year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hos- pital at close of year.	Treated at dispen- sary.	Total treated in hospital and dis- pensary.
DISEASES OF THE GENERATIVE OR- GANS—Continued.									
Prolapse of the vagina.....		2	1	1				3	5
Degeneration testicle.....								1	1
Amenorrhœa.....								2	2
Dysmenorrhœa.....		1	1					3	4
Metrorrhagia.....								3	3
Retention placenta.....	1		1					2	3
Œdema scrotum.....		2		2				2	4
Calculus.....		2		2				3	5
DISEASES OF THE ORGANS OF LOCOMO- TION.....									
	21	310	192	96	13	4	26	1,110	1,441
Inflammation of the bones—									
Osteitis.....	1	10	10	1				7	18
Periostitis.....	1	8	6	1		1	1	5	14
Caries.....		7	5	1			1	5	12
Necrosis.....	4	28	17	10			5	16	48
Inflammation of joints—									
Acute synovitis.....	2	35	16	16	1		4	32	69
Chronic synovitis.....		3		3				6	9
Suppuration.....								1	1
Ankylosis.....	2	3		3			2	2	7
Dislocation of articular cartilage.....								1	1
Loose body in joint.....		3	2	1					3
Dislocation, ankle.....		1	1						1
Dislocation, spine.....		2		1			1		2
Chronic abscess.....		1		1				6	7
Relaxation ligament.....								1	1
Caries of the spine.....	1						1		1
Necrosis of the spine.....		2	2						2
Psoas, lumbar, and other abscesses.....		5	2	1		1	1		5
Posterior curvature of spine.....		1		1				2	3
Posterior curvature of spine, angular.....	1					1			1
Anterior curvature of spine.....		1					1		1
Inflammation of muscles.....	1	1	2						2
Suppuration of muscles.....		2	2						2
Idiopathic muscular atrophy.....	1	2	2			1			3
Myalgia—									
Lumbago.....	6	148	93	44	8		9	883	1,037
Stiff neck.....		1			1			30	31
Inflammation of fasciæ.....								4	4
Contracture of fasciæ.....		1		1				3	4
Spontaneous rupture.....		1		1					1
Inflammation of tendons.....								3	3
Adhesion of tendons.....								3	3
Contraction of tendons.....								1	1
Inflammation of sheaths of tendons.....		3	2	1				16	19
Thecal abscess.....		1	1					5	6
Ganglion.....		2	2					7	9
Inflammation of bursæ—									
Acute.....		14	9	5				26	40
Chronic.....		2	1	1				7	9
Abscess of bursæ.....		7	7					3	10
Bunion.....		2	1	1				11	13
Bursal cyst.....		3	2	1				9	12
Bursal tumor.....		3	2	1				5	8
Flat foot.....	1	5	5			1		9	15
Clubfoot.....		2				2			2
Atrophy muscles.....								1	1
DISEASES OF THE CONNECTIVE TISSUE.....									
	18	329	223	95	7	8	14	770	1,117
Inflammation.....	3	110	80	25	3	2	3	220	333
Abscess.....	13	219	143	68	4	6	11	543	775
Gangrene.....	1			1				3	4
Œdema.....								4	4
Undue formation fat.....	1			1					1
DISEASES OF THE SKIN.....									
	25	484	307	168	12	1	21	2,132	2,641
Erythema.....		6	3	3				16	22
Roseola.....		2	2					2	4
Urticaria.....		6	4	2				81	87
Prickly heat.....		1	1					27	28
Eczema.....	1	45	24	19	2		1	448	494

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1908—Continued.

Disease.	Number of cases.								
	Remaining in hos- pital from pre- vious year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hos- pital at close of year.	Treated at dispen- sary.	Total treated in hospital and dis- pensary.
DISEASES OF THE SKIN—Continued.									
Impetigo.....		5	3	2				15	20
Pityriasis rubra.....								2	2
Prurigo.....								4	4
Lichen.....								5	5
Psoriasis.....	1	11	2	9			1	46	58
Herpes.....								3	3
Zona.....		13	8	4	1			36	49
Pemphigus.....								1	1
Dermatitis herpetiformis.....		3	1	2				5	8
Acne.....		1	1					53	54
Gutta rosea.....								1	1
Sycosis.....	1	3	2	2				18	22
Seborrhea.....								10	10
Ichthyosis.....		1		1				2	3
Herpes preputialis.....		6	3	3				91	97
Alopecia.....								2	2
Ulcer.....	19	218	137	82	2		16	482	719
Cicatrices.....		1	1						1
Boil.....		82	59	20	1		2	471	553
Carbuncle.....	1	33	23	9	1	1		59	93
Whitlow.....	2	11	9	3	1			64	77
Onychia.....		14	11	2	1			51	65
Corn.....		4	2	1			1	35	39
Cheloid.....		1			1			4	5
Wen.....		1	1					9	10
Hyperidrosis.....								6	6
Pruritus.....		1	1					28	29
Lupus.....		1		1				43	44
Ringworm.....		1	1					3	4
Frostbite.....		13	8	3	2			9	22
Injuries.....	154	2,255	1,459	766	23	44	117	5,183	7,592
GENERAL INJURIES.....	10	110	87	18		7	8	210	330
Effects of heat—									
Burns and scalds.....	6	65	53	10		5	3	179	250
Heat stroke.....		12	8	1		1	2	5	17
Sunstroke.....								4	4
Effects of cold.....		1		1				1	2
Effects of chemical irritants and cor- rosives.....		1		1				10	11
Multiple injury.....	3	25	21	4		1	2	8	36
Suffocation.....		4	3	1					4
Exhaustion.....	1		1					1	2
Shock.....		2	1				1	2	4
LOCAL INJURIES.....	144	2,145	1,372	748	23	37	109	4,973	7,262
Contusion of nerves.....								4	4
Contusion of muscles.....		2	2					32	34
Strain of m. scles.....	1	14	11	4				68	83
Rupture of muscles.....		1	1						1
Wound of muscles.....								2	2
Strain of tendons.....		2	1	1				7	9
Rupture of tendons.....	1		1					8	9
Wound of tendons.....		1	1					1	2
Contusion of skin.....	1	6	7					16	23
Abrasion of skin.....		6	4	2				62	68
Wound of skin.....		7	7					29	36
Burn or scald of skin.....	5	74	47	20	1	4	7	169	248
Frostbite.....		4	4					6	10
Effects on the skin of irritants or corrosives.....		1		1				11	12
Abrasion of mucous membrane.....								2	2
Wound of mucous membrane.....								1	1
Burn or scald of mucous membrane.....		4	2	2				7	11
Effects on the mucous membrane of irritants or corrosives.....								1	1
Contusion of scalp.....		4	3	1				27	31
Wound of scalp.....	6	81	56	28			3	213	300
Contusion of skull.....	1	5	3	3				6	12
Fracture of the vault of skull.....	1	12	4	3		5	1	1	14

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1908—Continued.

Disease.	Number of cases.								
	Remaining in hos- pital from pre- vious year.	Admitted during the year.	Recovered.	Improved.	Not improved.	Died.	Remaining in hos- pital at close of year.	Treated at dispen- sary.	Total treated in hospital and dis- pensary.
LOCAL INJURIES—Continued.									
Fracture of the base of skull.....		13	6	2		5			13
Wound of skull.....		4	1	1	1		1	1	5
Concussion of brain.....	2	12	8	6				1	15
Contusion of brain.....		3	3						3
Compression of brain.....		3	1			2			3
Contusion of face.....		16	11	4			1	44	60
Wound of face and mouth.....		57	37	17		1	2	154	211
Foreign bodies in the nose, antrum, or other cavities.....								4	4
Fracture of facial bones.....	6	30	16	19			1	14	50
Burn or scald of mouth.....		1		1				1	2
Contusion of eyelid.....		4	1	3				14	18
Wound of eyelid.....		3	3					11	14
Injury lachrymal gland.....								1	1
Wound of conjunctiva.....		1	1					5	6
Contusion of eyeball.....	1	1		2				12	14
Foreign bodies in the conjunctiva or cornea.....		5	4	1				73	78
Foreign body in eyeball.....		1		1				3	4
Wound of eyeball.....		9	6	3				3	12
Contusion of pinna.....		1	1					5	6
Wound of pinna.....								5	5
Rupture of membrana tympani.....		1		1				4	5
Foreign body in external meatus.....								5	5
Fracture larynx.....		1		1					1
Mutilation genitals.....								1	1
Dislocation parts sternum.....								5	5
Contusion of neck.....		2	1	1				6	8
Wound of neck.....		2		2				5	7
Foreign body in the food passages.....								3	3
Wound chest.....	2	10	6	3		2	1	6	18
Contusion of chest.....	2	52	36	15		1	2	132	186
Dislocation of costal cartilages.....		1		1				3	4
Fracture of ribs.....	4	87	54	30		4	3	72	163
Fracture of sternum.....								1	1
Wound of parietes of chest.....		6	1	5				2	8
Penetrating wound of pleura or lung.....		2		2					2
Contusion of back.....	2	70	47	23			2	94	166
Sprain of back.....		37	22	14			1	89	126
Wound of back.....	1	8	5	4				17	26
Fracture of spine.....		2				1	1		2
Concussion of cord.....	2	2	2	2				4	8
Contusion of abdomen.....		12	6	5		1		11	23
Wound of parietes of abdomen.....		4	3	1				9	13
Contusion of the pelvis.....		2	1	1				11	13
Contusion of the perinæum, scrotum, or penis.....								2	2
Wound of the male urethra, perin- æum, scrotum, testis, or penis.....		5	5					9	14
Wound of rectum.....		2	1	1					2
Rupture of urethra.....		2	2						2
Foreign body in the rectum.....								1	1
Fracture or dislocation of pelvic bones.....	1	4	4				1		5
Fracture spine with displacement.....		3		1		1	1		3
Compression chest.....								2	2
Contusion of testicle.....		5	5					4	9
Fracture vertebræ.....		2	1	1					2
Contusion of upper extremities.....	1	100	59	36	4		2	451	552
Sprain of shoulder.....		8	5	3				45	53
Sprain of elbow.....		4	2	2				14	18
Sprain of wrist.....	1	30	19	12				141	172
Sprain of hand.....		1	1					17	18
Sprain of thumb.....		1		1				16	17
Sprain of fingers.....	1	2	2	1				16	19
Wound of upper extremities.....	13	264	165	92	5	2	13	1,467	1,744
Wound of joint, upper extremities.....		1	1					14	15
Fracture of clavicle.....	2	23	9	14			2	16	41
Fracture of scapula.....		4	3	1					4
Fracture of humerus.....	2	14	8	5			3	3	19

TABLE IV.—TABULAR STATEMENT OF DISEASES AND INJURIES TREATED DURING THE YEAR ENDED JUNE 30, 1908—Continued.

[illegible]

TABLE V.—COMPARATIVE EXHIBIT—RATIO OF DEATHS FROM SPECIFIC CAUSES, 1899–1908.

Deaths from—	General average.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
General diseases.....	48.88	55.60	44.02	45.60	44.01	48.06	49.49	53.46	51.52	52.17	44.92
Diseases of the—											
Nervous system.....	5.63	3.02	3.62	8.78	7.29	5.36	5.30	6.32	4.87	6.72	5.06
Circulatory system...	10.78	9.07	9.71	11.87	12.23	10.72	8.76	11.88	11.16	10.47	12.06
Respiratory system...	12.02	9.30	15.12	13.53	13.54	11.64	14.66	8.81	9.13	11.06	13.42
Digestive system.....	6.69	7.67	9.70	6.65	7.55	7.39	7.33	4.79	5.88	5.34	4.67
Genito-urinary system.....	6.89	8.37	9.03	5.70	4.94	6.65	6.72	5.74	6.09	5.54	10.13
Injuries.....	6.65	5.35	6.32	5.22	7.55	6.47	5.09	7.09	9.13	7.12	7.20
From all other causes...	2.41	1.62	2.48	2.61	2.86	3.71	2.65	1.91	2.22	1.58	2.54

TABLE VI.—NATIVITIES OF PATIENTS TREATED IN HOSPITAL DURING THE FISCAL YEAR ENDED JUNE 30, 1908.

Country.	Number.	Country.	Number.
Total.....	14,778	Ireland.....	686
Alaska.....	8	Italy.....	70
Argentine Republic.....	4	Japan.....	57
Australia.....	50	Mexico.....	15
Austria.....	164	Netherlands.....	54
Belgium.....	37	Newfoundland.....	102
Canada.....	463	Norway.....	1,164
Cape Verde Islands.....	82	Peru.....	2
Central America.....	1	Philippines.....	15
Chile.....	28	Porto Rico.....	38
China.....	15	Portugal.....	78
Cuba.....	4	Russia.....	155
Denmark.....	229	Scotland.....	226
England.....	514	Spain.....	228
Finland.....	367	Sweden.....	813
France.....	117	Switzerland.....	31
Germany.....	834	Turkey.....	10
Greece.....	124	United States.....	7,558
Hawaii.....	74	Wales.....	22
India.....	13	West Indies.....	215
		All other countries.....	111

TABLE VII.—SURGICAL OPERATIONS, FISCAL YEAR 1908.

Operations.	No. of cases.	Operations.	No. of cases.
Total number of operations.....	1,844	OPERATIONS FOR REMOVAL OF FOREIGN BODIES.....	72
OPERATIONS FOR REMOVAL OF TUMORS.....	133	From—	
Lipoma.....	10	Eye.....	31
Fibroma.....	12	Leg.....	7
Myxoma.....	4	Finger.....	11
Adenoma.....	1	Hand.....	15
Papilloma.....	19	Arm.....	6
Carcinoma.....	5	Shoulder.....	2
Sarcoma.....	4	OPERATIONS ON BLOOD VESSELS.....	55
Epithelioma.....	3	On arteries.....	9
Hematoma.....	11	For hemorrhage.....	6
OPERATIONS ON CYSTS.....	64	For aneurism.....	3
Sebaceous.....	32	On veins.....	46
Serous.....	11	Obiteration of varices of leg.....	46
Dermoid.....	4		
Bursal.....	17		

TABLE VII.—SURGICAL OPERATIONS, FISCAL YEAR 1908—Continued.

Operations.	No. of cases.	Operations.	No. of cases.
OPERATIONS ON NERVES.....	8	OPERATIONS ON JOINTS.....	50
Stretching of nerve.....	3	Reduction of dislocation.....	28
Suture of nerve.....	4	Shoulder.....	16
Resection of nerve.....	1	Elbow.....	4
OPERATIONS ON LYMPHATIC ORGANS.....	296	Hip.....	1
Incision and drainage of suppurating glands.....	112	Inferior maxilla.....	2
Groin.....	103	Ankle.....	1
Neck.....	8	Wrist.....	2
Axilla.....	1	Phalanx.....	1
Removal of lymphatic glands.....	184	Costal cartilage.....	1
Groin.....	179	Operations for ankylosis of joints....	5
Neck.....	3	Elbow.....	1
Axilla.....	2	Wrist.....	1
OPERATIONS ON THE SKIN AND SUBCUTANEOUS TISSUE.....	161	Finger.....	1
For chronic ulcer of the leg.....	7	Knee.....	2
For wound of—		Inflammation of bursa.....	10
Scalp.....	52	Knee.....	6
Face.....	13	Elbow.....	4
Hand.....	43	Aspiration of joint.....	3
Leg.....	7	Knee.....	3
Foot.....	9	Incision and drainage.....	4
Skin graft for—		Knee.....	2
Burn.....	1	Elbow.....	2
Ulcer.....	23	OPERATIONS ON MUSCLES, TENDONS, AND FASCIA.....	5
Ingrowing toe nail.....	6	Tenotomy.....	2
OPERATIONS ON BONES.....	58	Suture of tendon.....	3
Excision of portion of bone.....	23	AMPUTATIONS.....	73
Inferior maxilla.....	2	Thigh.....	3
Tibia.....	5	Leg.....	16
Femur.....	2	Arm.....	2
Ribs.....	1	Forearm.....	2
Metatarsal.....	4	Finger.....	38
Ulna.....	2	Toe.....	10
Phalanx.....	4	Foot.....	1
Radius.....	1	Hand.....	1
Metacarpal.....	1	OPERATIONS ON THE SKULL.....	13
Superior maxilla.....	1	Trephining.....	6
Removal of necrosed bone by curetting and scraping.....	17	Opening mastoid cells.....	7
Inferior maxilla.....	2	OPERATIONS ON FACE, NASAL CAVITIES, AND MOUTH.....	10
Tibia.....	4	For deformity of nose.....	1
Femur.....	2	Removal of polypi.....	2
Ulna.....	1	Tonsilectomy.....	4
Phalanx.....	1	Removal of turbinate.....	2
Vertebræ.....	1	Removal of adenoids.....	1
Frontal.....	1	OPERATIONS ON THE EYE.....	6
Sternum.....	2	Enucleation of eye.....	5
Carpal.....	1	Removal of pterygium.....	1
Metatarsal.....	2	OPERATIONS ON THORAX.....	20
Operations on fractured bones.....	18	Paracentesis of pleural cavity.....	13
Radius.....	1	Thoracotomy.....	2
Inferior maxilla.....	3	Excision of part of rib.....	5
Radius and ulna.....	1		
Patella.....	3		
Tibia and fibula.....	3		
Tibia.....	1		
Phalanx.....	2		
Fibula.....	1		
Scapula.....	1		
Vertebræ.....	1		
Skull.....	1		

TABLE VII.—SURGICAL OPERATIONS, FISCAL YEAR 1908—Continued

Operations.	No. of cases.	Operations.	No. of cases.
OPERATIONS ON THE ABDOMEN.....	249	OPERATIONS ON MALE GENERATIVE ORGANS—Continued.	
Abdominal section.....	92	By excision of part of sac.....	16
Appendicitis.....	48	By incision and drainage.....	7
Peritonitis.....	2	Castration.....	11
Exploration.....	5	GUNSHOT WOUNDS.....	11
Gastro-enterostomy.....	2	Pelvis.....	1
Suture of intestine.....	2	Arm.....	3
Cholecystostomy.....	1	Thorax.....	2
Appendicostomy.....	1	Leg.....	3
Pyonephrosis.....	1	Hand.....	1
Intestinal obstruction.....	2	Foot.....	1
Paracentesis of abdomen.....	27	Carbuncle.....	3
Cirrhosis of liver—Talma's operation.....	1	EVACUATION OF ABSCESES.....	167
Operations for cure of hernia.....	157	Arm.....	22
Umbilical.....	2	Axilla.....	6
Ventral.....	6	Back.....	1
Femoral.....	2	Buttock.....	3
Inguinal.....	147	Face.....	15
OPERATIONS ON RECTUM AND ANUS.....	111	Finger.....	12
Fistula in ano.....	47	Foot.....	5
Anal fissure.....	3	Hand.....	33
Hemorrhoids.....	59	Ischio rectal fossa.....	23
Stricture of rectum.....	1	Knee.....	4
Recto-urethral stricture.....	1	Leg.....	8
OPERATIONS ON BLADDER AND URETHRA.....	70	Liver.....	3
Suprapubic cystotomy.....	2	Perineum.....	8
Stricture of urethra.....	64	Periurethral.....	2
Gradual dilatation.....	30	Popliteal.....	2
Internal urethrotomy.....	17	Post sternal.....	1
External urethrotomy.....	12	Presternal.....	3
Meatotomy.....	5	Psoas.....	5
Fistula of urethra.....	4	Pelvis.....	1
OPERATIONS ON MALE GENERATIVE ORGANS.....	269	Rectus muscle.....	2
Phimosis.....	181	Scalp.....	2
Varicocele.....	37	Scrotum.....	2
Deformity of penis.....	1	Subdiaphragmatic.....	1
Amputation of penis.....	1	Testis.....	2
Prostatectomy.....	6	Thumb.....	1
Hydrocele.....	32	OPERATIONS ON FEMALE GENERATIVE ORGANS.....	4
By tapping.....	6	Amputation of cervix uteri.....	1
By tapping and injection.....	3	Colporrhaphy.....	1
		Curettage of uterus.....	1
		Shortening of round ligaments.....	1

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